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From the Editor

It is an honor to be back at the helm of the journal that my IALEIA Mid-Atlantic Chapter started over 30 years ago as the *Law Enforcement Intelligence Analysis Digest.* We believed that the field, to be professional, needed documented methods and techniques and an outlet for members and others to share their voices.

Thirty-four years later, it is gratifying to see how far the journal has come, through the efforts of countless volunteers. Countless articles by practitioners and academics are now available to our membership through back issues on the website. As a peer reviewed journal, we offer an opportunity to all to further the practice of intelligence analysis internationally.

When Dr. Louisa Lanzarotti resigned as *JIA* editor last August, the IALEIA board began its search for a replacement. As a retiree, I volunteered knowing it is something I can do work with authors to make it the best journal possible. As part of the transition, the following noted editorial contributors have resigned from the board but are heartily thanked for all their effort in the *JIA*:

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Case Study: Managing Risk Through the Use of Structured Analytic Techniques

DARIO GALASSO

Abstract

This case study describes the use of structured analytic techniques to manage the risk surrounding the release of a convicted terrorist. Force field analysis, diagnosticity, scenario generation, and analysis of competing hypotheses were among the techniques used successfully to increase foresight, inform tactical planning, and guide intelligence collection both before and after the prisoner's release.

While this specific case relates to counter-terrorism, the robust and evidence-based approach can be replicated in any area of policing and the analytical techniques can be used to tackle any problem type. The overall approach blends strategic and tactical planning and forms an instructive example for risk holders and for those managing intelligence or analytical functions. The combined and complimentary application of SATs at both strategic and tactical levels highlights important methodological points for intelligence analysts.

Keywords: Counter-terrorism, intelligence analysis, planning, prisons, risk management, structured analytic techniques

Future proofing

At the time of his arrest, Paul (a pseudonym) was involved in the radicalisation of other young Muslims culminating in the overt encouragement of travel to Syria in support of ISIS. He had been groomed by a close relative: a subject of interest in his own right who led extremist discussions with local Muslims. Once radicalised, Paul began travelling outside Thames Valley, UK, to deliver extremist speeches of his own in other parts of the country to young and impressionable audiences. Following a long-running operation, Paul was arrested and convicted under the Terrorism Act 2000.

Years later, an uneventful prison term had generated little new information about Paul's mind-set and intentions. The nature of his offence suggested that he may still pose a risk to the community, and there were safeguarding concerns related to the fact that Paul had a young family. However, the intelligence picture offered little insight into what the future might hold once Paul was released.

The question faced was therefore: how would Paul behave once he was released, and how could authorities use this knowledge to manage the risk he posed? In essence, what was required was the ability to envision plausible future states for Paul against which authorities could plan. Achieving this would permit proportionate contingency planning to manage the risks relating to each future state.

However, while this approach recognises an element of proactivity it remains, at heart, reactive—because officials would simply be responding (albeit proactively) to the future scenarios identified, rather than actively shaping them. The real objective was therefore, not only to envision plausible futures for Paul and to plan for them, but also to determine what police and other stakeholders could do to steer Paul away from undesirable, high-risk futures and guide him towards desirable, low-risk futures. It was determined that the most effective way to do this was through the use of structured analytic techniques.

Why structured analytic techniques?

Structured analytic techniques (SATs) provide analysts with a means of externalising their thoughts and thought processes so that they are apparent, understandable, replicable, and open to critique by others. By promoting collaboration, transparency, and discussion, SATs significantly reduce the risk of 'getting it wrong'.

In contrast to the nine analytical techniques specified in the UK's National Intelligence Model[1] (National Criminal Intelligence Service, 2000), SATs aim less at pattern identification and more at identifying and developing alternative explanations and outcomes. This makes them especially well-suited to dealing with issues about which there is no prevailing wisdom, or about which there are conflicting views. Questions about the future are model examples of such issues.

A further important reason for using SATs is that they recognise the risks that our cognitive limitations bring to analysis, and make strong attempts to mitigate or avoid them. In this sense, they promote what Daniel Kahneman calls "System 2" thinking – a self-conscious

1 The nine are crime pattern analysis, network analysis, operational intelligence assessment, market profiles, social/demographic trend analysis, criminal business profiles, subject analysis, risk analysis and results analysis.

(but not infallible) state of mind that is more deliberative, logical and controlled.[2] When engaged in System 2 thinking, analysts are more open to alternatives, more able to recognise bias and more willing to question themselves.

Playing the field

The first step towards envisioning plausible futures for Paul was to understand the various forces impacting upon his future choice of lifestyle and the relative weight of each force. 'Force field analysis' was used to achieve this. The use of a structured analytic technique to identify the relevant forces was crucial to avoiding the bias that 'once a terrorist, always a terrorist' and to facilitate a full and fair assessment of Paul's situation.

Force field analysis is a structured method of identifying and evaluating all the forces acting for or against an individual, situation, or outcome. It promotes a full understanding of all the relevant factors and helps to avoid unjustified emphasis on only one side of the argument. Scoring each force or factor helps analysts to pinpoint those carrying the most weight and to make appropriate recommendations to strengthen forces that tend in a positive direction and to weaken those tending towards undesirable ends (Heuer and Pherson, 2014).

Forces impacting upon Paul were identified through a thorough and systematic review of the intelligence, brainstorming against the PESTELO mnemonic[3], and engagement with colleagues with prior knowledge or experience of Paul and his index offence. In total, 34 distinct forces were identified as relevant to determining the kind of futures towards which Paul may gravitate.

In order to weight the various factors, seven colleagues were selected to score each one based on how influential it was deemed to be in determining Paul's future. Factors of only minimal influence received a score of one, and those judged to have a very strong influence received a score of five. Participants comprised police staff as well as police officers, and included those with direct experience of Paul as well as those with little or no knowledge of him.

When the exercise was complete, scores were aggregated and the competing forces ranked according to the strength of their influence. This gave rise to two shortlists (or opposing 'force fields') consisting of highly influential forces tending either towards or away from desirable future scenarios.

A KEY OUTCOME

A pivotal discovery was that the numbers of positive and negative forces and the scores they received were almost equally balanced. This indicated that Paul was as likely to move towards a positive future (from a counter-terrorism perspective) as he was to move towards a negative one. To put this another way, there was as much of an opportunity to assist Paul to lead a stable and law-abiding lifestyle as there was a need to manage the

2 Read Kahneman's excellent Thinking, fast and slow (2011) for an explanation of the System 1/ System 2 distinction.

3 Political, Economic, Social, Technological, Environmental, Legal, Organisational (police analysis).

threat he posed. This insight played a key role in the intelligence manager's subsequent decision-making process.

The generation game

The results of the force field analysis directly fed a scenario generation technique, known within UK government as the 'cone of plausibility' (so-named based on the shape of the template commonly used to complete it). The technique involves identifying key drivers affecting an outcome, making explicit assumptions about each one, and then using them to generate plausible scenarios to guide understanding, planning, and response.

The highest scoring forces from the force field analysis provided the key drivers for scenario generation. These drivers were:

1. Employment
2. Internet usage
3. Religious understanding
4. Travel
5. Family and peer group

Explicit assumptions were made about each one, based upon which plausible future scenarios were generated. For example, it was assumed that Paul's state of unemployment would persist (driver 1), and that planned license conditions[4] restricting Paul's movements would in fact be applied post-release (driver 4).

By considering likely interactions between the drivers and experimentally changing the assumptions made about each one, four plausible future scenarios were developed. The essence of each scenario is summarised below:

- *Scenario A*
  Paul abides by his license conditions but does so with resentment, secretly looking for ways to breach his conditions undetected (baseline scenario).
- *Scenario B*
  Paul's mind-set gradually changes as a result of stable employment and regular meetings with a theological mentor (best-case scenario).
- *Scenario C*
  Paul rejects authority and breaches his license conditions as he seeks to re-engage with extremist associates and terrorist activity (worst-case scenario).
- *Scenario D*
  Paul turns his back on his extremist past and devotes his full attention to re-building his relationship with his family (wild card scenario).

Scenarios A and C represented undesirable futures from a police perspective; scenarios B and D represented desirable outcomes. Scenario B was judged to be the ideal scenario and was that to which efforts were primarily directed. Scenario C was the worst-case scenario away from which officials sought to manoeuvre Paul.

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4 License conditions are conditions imposed on a released prisoner by the UK's National Probation Service and typically include curfews and other restrictions on travel, associations and activities.

KEY OUTCOMES

The development of tangible, evidence-based future scenarios promoted awareness and understanding among analysts and officers alike of the range of possibilities that could develop. Those involved acknowledged that this helped to focus thought and action on the areas of greatest risk, and helped to avoid speculative planning for an assumed (but unfounded) future. Importantly, the acknowledgement of several alternative futures mitigated the risk of confirmation bias, as there was not just one future upon which to focus.[5]

Most significantly, the prioritised list of influencing factors (generated through force field analysis) and resulting scenarios acted as the basis for an operational planning meeting during which risk holders authorised targeted action designed to mitigate negative forces—those tending towards undesirable scenarios—and amplify positive ones.

For example, to counteract Paul's weak understanding of Islam he was recommended and supported for inclusion in a government de-radicalisation program; to mitigate the risk of online contact with extremists or extremist media, stringent license conditions were imposed on Paul's internet usage; and to promote stability in Paul's life, viable employment options were identified.

In addition to helping to manage the risk Paul posed to the community, these actions (and others) met statutory safeguarding duties by proactively promoting desirable futures for Paul upon his release and directing him away from malign influences. The intelligence manager highlighted this as a key outcome.

An indicator of things to come

Before continuing with Paul's story, it is instructive to consider an important complimentary analytical activity that was carried out following the generation of future scenarios: the identification of *scenario indicators* (Heuer and Pherson, 2014).

There is only limited value in attempting to increase foresight by developing scenarios if there is no way of recognising these scenarios ahead of time. For this reason, a series of brainstorming sessions was conducted, centred on each of the four scenarios, to identify a comprehensive list of indicators—or signposts—that would provide early warning that a particular scenario (e.g. the worst-case scenario) was coming into view. This would allow officials to take timely and remedial action to steer Paul from undesirable scenarios to desirable ones and, most importantly, reduce the risk of surprise. In total, approximately 100 indicators of one or more of the four scenarios were identified.

Imagine that Paul was approached by extremist associates and invited to re-engage with them, and that he rejected the invitation. This would be inconsistent with the worst-case scenario (scenario 3), in which he seeks to re-engage with terrorism. If he sought involvement in terrorist acts, it is unlikely that he would turn down the opportunity to re-connect with his old associates. However, a rejection of extremist contact would be consistent with scenarios 2 and 4, and offer hope that Paul was heading in a reassuring direction.

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5 Confirmation bias is the tendency to look only for information that supports a favoured theory, and to ignore or under-estimate the strength of information that undermines it. The range of cognitive biases to which intelligence analysts (and, indeed, all humans) are prone is demonstrated by Richards Heuer in his seminal work *Psychology of Intelligence Analysis* (1999).

Similarly, it could be argued that were Paul's wife to fall pregnant with his child this would act as an accelerator pushing Paul towards the (desirable) wild card scenario, in which he rejects extremism in favour of family life. A pregnancy would not be inconsistent with scenarios 1-3, but it would be highly consistent with scenario 4.

This second example hints at an important concept in indicator development: *diagnosticity* (Heuer, 1999). An indicator that is equally consistent with all scenarios has no diagnostic value, because it does not help to choose between them. Furthermore, an indicator that does distinguish between scenarios may do so to different extents—the pregnancy indicator, for example, clearly distinguishes scenario 4 from the others but does not distinguish between scenarios 1-3.

Other key characteristics of indicators that were taken into account were *observability* and *timeliness*. An indicator may be highly diagnostic but also highly unlikely to be observed (or perhaps impossible to observe through available resources). Such an indicator is of little use. Other indicators may be highly observable but by their nature be observed too late to take remedial action. For example, the observation that an individual has just removed their jacket to reveal a suicide vest has very likely come too late for someone to do anything to stop its detonation.

KEY OUTCOMES

By filtering on the key characteristics of diagnosticity, observability, and timeliness to remove undiagnostic, unobservable, and untimely indicators, the initial list of 100 indicators was reduced to a manageable shortlist of just 34. Each of these indicators acted as a practical signpost to one or more of the four scenarios identified.

This outcome formed the basis for tactical intelligence gathering, as efforts could now be focused on collecting the types of information most diagnostic of the future. Understanding which indicators were signposts of which scenarios also allowed for balanced and proportionate data collection to ensure that each scenario was given an equal chance of revealing itself.

The key indicators were shared with investigative teams, probation officers, and other partners to raise awareness and understanding, and to maximise opportunities for meaningful information gathering.

Back to the future

Fast-forwarding several months, Paul had now been released and our targeted information gathering was yielding varied and useful diagnostic information. Having given ourselves the best possible chance of achieving early recognition of high-risk futures, the question now became: based on the intelligence, towards which future was Paul in fact heading?

To answer this question, the 'analysis of competing hypotheses' (ACH) technique was used. ACH employs a matrix format to evaluate the intelligence and any underlying assumptions against a series of hypotheses or scenarios to determine which can be refuted (Heuer, 1999).

The orientation towards refutation is crucial. Similar to the way that a scientist tests the 'null hypothesis' (i.e. the *opposite* of a favoured theory), ACH is directed towards disproving—and not proving—hypotheses. The most likely hypothesis or scenario is that with

the least information against it (not the one with the most information for it), as well as information consistent with it. Setting out to try and *prove* a hypothesis invites confirmation bias by encouraging unwarranted focus on 'pet theories' and causing an analyst to underestimate the impact of information that is inconsistent with these theories.

Each item of intelligence was evaluated against each future scenario to determine whether it was: highly inconsistent with it; inconsistent; neutral or irrelevant; consistent; or highly consistent. Based on the answer, each scenario received a score from -2 for 'highly inconsistent' to +2 for 'highly consistent'. Totalling the scores for each scenario revealed the one least inconsistent with the intelligence and therefore most likely to be emerging.

KEY OUTCOMES

The surprising outcome of the ACH was that the future scenario in fact emerging was the wild card scenario, in which Paul appeared to be dedicating himself to family life, and not one of the scenarios initially judged to be much more likely.

This is significant because, had we not sought to foresee a range of potential futures and only focused on one, it is unlikely to have been this scenario. We may have expended valuable resources preparing for something that would not happen, and may have wrongly interpreted the intelligence to fit a pre-determined and erroneous conclusion.

Nonetheless, all other scenarios remained on the table and everyone involved maintained an awareness that the situation could change at any time: an unforeseen trigger event (such as the death of a loved one) could quickly and unexpectedly divert Paul from one future to another.

Understanding the future towards which Paul was heading allowed stakeholders to take action to amplify forces that would continue to shepherd Paul in this positive direction, and to mitigate specifically those forces acting as an obstacle to him reaching this destination.

For example, during Ramadan, Paul's curfew was extended to allow him to break the fast and spend quality time with his family. This allowance demonstrated respect for Paul's Islamic heritage while implicitly promoting the development of a strong family unit. Similarly, in recognition of the importance of stable employment it was recommended that any unnecessary obstacles to Paul's completion of an online course of study be removed so that he stood the best chance of finding rewarding work.

Both of these actions proactively shaped the future in a way that simply reacting to events would not have. Use of ACH provided early warning of the future before it had fully emerged enabling officials to accelerate the development of that future through targeted, proportionate and supportive action.

Implications for policing

Paul's story goes on, and it remains possible that the positive future towards which he seems to be heading may morph into another, quite different state. However, a number of key learning points relevant to both risk holders and intelligence staff can be discerned from his case.

FORESIGHT, NOT FORECASTS

Traditionally, attempts to forecast the future have focused on correctly identifying, with as much certainty as possible, the one future that will occur. There can be, after all, only a single future. Forecasting a single future focuses attention and action upon it. A forecast will be either right or wrong.

The SAT-based approach described in this case study takes forecasting one step further. Instead of forecasting a single future, it increases awareness and foresight of multiple, alternate futures. Instead of directing recommendations towards a single end, it encourages consideration of how one can bend, shape, and influence an uncertain but pliable threat landscape to bring about the end most favourable to a subject's welfare. For the SAT practitioner, it is not a question of right or wrong but of better or worse.

This approach is of direct relevance to risk holders. The development of alternate future scenarios encourages greater open-mindedness, both to what may in fact transpire and to acceptable alternatives. The ability to recognise diagnostic evidence primes police and partners to recognise signposts to desirable and undesirable futures, helping to defuse risk early on. And, crucially, proactively taking evidence-based action to help a desirable future emerge demonstrates the intelligence-led ethos in its purest form: one can truly be said to be taking control of the future and not simply responding to it.

TACTICAL PLANNING

Analytical outputs from the SAT process can provide a visual and impactful agenda for tactical planning meetings. The prioritised list of forces acting for and against Paul, the clear and provocative statement of alternate futures, and the identification of observable signposts each encourage discussion and consideration of the most appropriate and proportionate action. In the words of the intelligence manager, the application of SATs to Paul's case was a 'forward thinking' approach that 'allowed me as an intelligence manager to make informed decisions to focus limited resources'.

As tactics are implemented, the results can be fed back into the ACH allowing for a continual evaluation of whether they are having the desired effect (i.e. whether they are successfully promoting the favoured future scenario). This evaluation will show that each potential future is constantly emerging and receding, jostling for position with other potential futures, in response to our tactics. The ability to recognise this allows intelligence managers to fine-tune strategy and tactics. Tactical activity is both a consequence and a cause of strategy.

ANALYTIC GOOD PRACTICE

Paul's case demonstrates that intelligence analysts can play a tangible and influential role in risk assessment and risk management. This role goes far beyond simply identifying threats and their likelihood (a common analytical contribution to the risk assessment process). Rather, it encompasses the entire breadth of what is possible, how to recognise it, what it implies and what analysts can do to shape it.

Taking a collaborative approach to the analysis—involving officers, managers, and partners in scoring exercises and brainstorming sessions—increases the credibility of the results as there will be greater collective confidence that alternatives and counter-arguments have

been considered. Involving customers in the analytic process also serves to demystify it for some and to increase the buy-in of all: customers recognise their own ideas and insights in the final product and are more invested in its tactical application.

Most significantly, SATs produce stronger analysis because they increase resilience to bias and assumption, and improve the ability to identify and evaluate alternative explanations and outcomes. These alternatives enhance the evidence base upon which decisions are made and increase the likelihood that these decisions are appropriate, proportionate, and timely.

Conclusion: throw your SAT in the ring…

Imaginative and systematic use of SATs can give police a competitive advantage over criminals and terrorists by foreseeing and shaping futures of which even the latter are unaware. In doing so, SATs greatly reduce the risk of surprise or of simply 'getting things wrong'. They create a cognitive openness to alternative explanations and prime us to recognise diagnostic events when they occur, promoting proactivity and responsiveness. The application of structured analysis was identified by the intelligence manager as a 'gold standard' that should be replicated in future cases.

While this specific case relates to counter-terrorism, the robust and evidence-based approach can be replicated in any area of policing and the analytical techniques can be used to tackle any problem type. The overall approach blends strategic and tactical planning and forms an instructive example for risk holders and for those managing intelligence or analytical functions. The combined and complimentary application of SATs at both strategic and tactical levels highlights valuable methodological points for intelligence analysts.

About the Author

DARIO GALASSO has 13 years of experience as an intelligence analyst in law enforcement organisations in the UK and overseas, including two years based at Interpol headquarters in Lyon, France. He has worked on a range of crime types including volume crime, major crime, serious and organised crime, and now counter-terrorism. His innovative use of structured analytic techniques has been incorporated into the United Kingdom's national counter-terrorism policing network's analyst core training as an example of good practice.

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Teaching Intelligence Analysts Writing Skills: A Program Evaluation

SHELAGH DORN, PH.D.

Abstract

Due to increasing public scrutiny of the intelligence analysis profession, standards and skill development for law enforcement intelligence analysts have emerged as topics of international importance. Subsequently, several federal agencies, including the US Department of Homeland Security (DHS), have funded development of supplemental course curricula to increase capabilities and effectiveness of law enforcement intelligence analysts. Despite expending grant money and prescriptive intelligence standards proliferating, output and outcome evaluation to determine whether training has had desirable effects has not occurred.

According to DHS intelligence guidelines, the ability to write effectively is a highly desired competency. Analysis of writing course evaluations seeks to determine whether a six-week, online writing course curriculum has measurable effects on student skills. A review of course methodology and effectiveness, using pre- and post- test evaluations of student writing, demonstrates a statistically significant increase in mean class performance in writing. These results are compared with instructor feedback and student self-appraisal.

In comparison with traditional academic programs, specific challenges include: lack of standardized performance measures for intelligence training; andragogy; a community of students constrained by work duties; and technology and access concerns.

Keywords: writing, intelligence education, communication, criminal intelligence analysis, fusion center, law enforcement, training, outcome, performance measurement

Introduction

Training is a critical component of an effective, productive law enforcement organization. However, research about police training and its relationship to good performance is largely theoretical and based upon conjecture. As noted in a literature review by the National Research Council (2004, p. 141), critical review of training programs fails to connect class instruction with job performance. "Prior research has not taken into account the substantive content of training programs, modes of instruction, the abilities of the instructors, the timing of training, or the organizational support for reinforcing the objectives of the training program." As the public safety workforce has evolved to include intelligence analysts, the need for standardized, thorough, and consistent training programs that address tactical and strategic intelligence (Peterson, 1997) has flourished (Dorn et al., 2009). Such programs have been slow to develop, and, similar to other police training programs, remain largely unsubstantiated by independent review.

Diversity in the workforce provides differing perspectives that may be productive for fusion centers or could be detrimental to operations (Masse, O'Neil, & Rollins, 2007). As several critics note, the aggressive hiring practices to fill analyst billets, while unprecedented, also lacks strategic vision (Moore, Krizan, & Moore, 2005). As with police, the law enforcement intelligence analyst workforce is drawn from a variety of backgrounds and academic majors. Individuals with only five-day intelligence training courses are hired next to analysts with Masters or PhD degrees, and sit alongside analysts with experience in multiple operational theatres. Such varying perspectives and backgrounds can be both beneficial and challenging. The key to analyst development is to establish core competencies for hiring future federal personnel, specifically, five pillars to develop analyst skills: hiring, training, deploying, developing, and evaluating (Moore, Krizan & Moore, 2005.). Core competencies have been part of the law enforcement intelligence analyst lexicon for more than a decade (IALEIA & Global Intelligence Working Group, 2012). Yet until such a comprehensive framework is established and adopted throughout the intelligence community, agencies must be responsible for homogenizing analysts from a wide variety of backgrounds by training them in the necessary skills and duties after they are hired.

However, more pervasive concerns about the innate abilities of intelligence analysts to function in today's environment involve critical thinking (Peterson, 1997; Marrin, 2009), analysis (Peterson, 1997), and writing skills. Some authors profess that the basis of US intelligence failure (Bar-Joseph & McDermott, 2008) can be largely attributed to analyst personality/professional skills, unmotivated biases and heuristics, and motivated biases, e.g. politicization of intelligence (Bar-Joseph, 2010; Bar-Joseph & McDermott, 2008; Goodman & Omand, 2009; Johnston, 2005; Krizan, 1999). Identifying relevant courses and ensuring that analysts are properly trained to avoid personal and professional biases are current challenges facing today's intelligence analysis managers.

Rigorous evaluation of training has been noticeably absent from law enforcement and intelligence (National Research Council, 2004). This study provides an overview of the literature regarding academic and professional intelligence education; frames the significance of intelligence writing as a necessary, demonstrable part of the intelligence analyst's tradecraft; and discusses the necessity of scientific evaluation and measurement of training output and outcomes. Assessment of law enforcement intelligence training programs must be focused, thorough, independent, and replicable. Through examination of the

Intermediate Fusion Center Analyst Training (IFCAT) program writing course curricula and procedures, and analysis of student pre-test and post-test writing samples, this study reviews the efficacy of a writing course delivered to law enforcement intelligence analysts in fusion centers nationwide.

Literature Review

While intelligence analysis is a comparatively new field of academic concentration, its importance within the professional environment has become publicly recognized in the past decade. Campbell (2011) notes that three factors contribute to the post-9/11 growth of intelligence education: (1) emerging academic programs dedicated to intelligence; (2) the growth and acceptance of web-based and distance learning courses; and (3) an increased federally-driven desire for intelligence education standardization.

Higher education has responded to highly publicized deficiencies in intelligence by creating academic majors or offering certificate-based coursework. Universities' academic expansion into intelligence studies (Peterson, 1997; Campbell, 2011; Spracher, 2009) parallels the rapid evolvement evolution of the interdisciplinary "homeland security" concentration during the past decade (Pelfrey & Pelfrey, 2009). Most of these university programs, however, focus on training analysts for national security, business, and the military, rather than law enforcement intelligence analysis (Green, 2008). Currently, only a minority of law enforcement intelligence analysts in the United States have majored in intelligence studies or homeland security. As these programs flourish, however, the workforce's academic preparation may similarly change.

Realizing the chasm in preparation between employees with various academic undergraduate and graduate school degrees, those with on-the-job experience, and those with a mixture of the two, law enforcement intelligence units are expected to bridge gaps in knowledge and skills with training courses. The discrepancy between job task expectations and skills poses a challenge to the profession of law enforcement intelligence analysis. This tension becomes most obvious within fusion centers and interagency intelligence settings. Certain skills and strengths are necessary to succeed within the field (Manzi, 2008); analysts from a variety of backgrounds and disciplines (Cope, 2004) must receive comprehensive on-the-job training to provide uniformity and meet performance standards.

The importance of piloting additional training for law enforcement and fusion center intelligence analysts has been discussed during the past several years by fusion center executives in partnership with the US Department of Homeland Security. Analyst *Baseline Capabilities* document suggests that analysts need opportunities to present intelligence analysis and receive feedback on the quality of their reports and presentations. (Global, 2008)

Primary focus has been upon training and educating the federal-level intelligence community; until recently, little attention had been paid to regional, state, local, and tribal law enforcement intelligence analysis. In the United States, a needs assessment of intelligence training in 2004 revealed that lack of funding for training, difficulty of finding good trainers, and travel and lodging costs were primary impediments to law enforcement intelligence training. Other barriers included respondents unsure of the training available; sporadic training offerings; and being unsure of the type of training needed for their intelligence personnel (Criminal Intelligence Training Coordination Strategy Working Group, 2004; in Carter, 2004, 2010).

Similar to the 1980s and the 1990s, basic intelligence analysis training consists of orientation training courses of short duration (Fahlman, 1998). In the US, basic analyst training curricula, usually 40 hours in duration, has set a baseline standard for entry-level law enforcement analysts. However, advanced training in skills and technical tradecraft has been left up to analysts and managers to puzzle through during the past decade, contingent upon a number of operational concerns. As a result, law enforcement analysts have enrolled in ad hoc, non-standardized training dependent upon course cost and availability (Carter, 2009; Dorn et al., 2009) staffing and scheduling constraints (Dorn et al., 2009), and reputation of course and instructor efficacy. The development of "intermediate" analytic standards (Global Intelligence Working Group, 2013) emphasizes the difficulties with defining, measuring, and training law enforcement intelligence analysts in skills beyond basic levels of competence. Yet law enforcement intelligence analysts agree that inductive reasoning, comprehension, and writing and communication skills are essential to perform job tasks (Lemieux, 2005).

The Sacramento Joint Powers Authority's 2007 needs assessment survey for fusion center intelligence analysts reinforces the awareness that analysts face specific difficulties with analytical and writing skills. Twenty-one fusion centers responded to this survey. Eighteen centers noted that even though their analysts had received analytical thinking and tools training, "training identified as most needed included analytical skills, terrorism fundamentals, and report and analytical writing" as well as "identifying reportable intelligence, intelligence methodologies, open source exploitation, anticipating law enforcement needs, advanced research skills, and analytic tools." (Nenneman, 2008, p. 64)

TRAINING COURSE ASSESSMENT

Program and project assessment are key when determining strengths, weaknesses, and opportunities for improvement in training course curriculum evaluation. Courses that have been designed should prove that learning objectives coincide with results; "(T)he efficacy of the information provided in the program must be both dynamic and constantly tested through rigorous program evaluation" (Pelfrey & Pelfrey, 2009, p. 56). Formal program evaluation (adapted from *California State University, Chico, Assessment Plan,* 1998; Stassen, Doherty, & Poe, 2001) should include analysis of Learning goals and objectives, Learning processes, Assessment methods, Assessment plan and processes, Results, and Recommendations. Effective program assessment is generally systematic, cumulative, ongoing, multi-faceted, and pragmatic. Tangible goals, which outline learning concepts and objectives, are the basis for course development. A best-case scenario would assess students' skills and knowledge at the point of entry into a course; and would provide evidence that the course, as an intervention, demonstrates a positive effect on the students. Finally, course design should marry performance objectives with outcomes, or the desired end results. (Stassen et al., 2001)

Similarly, Johnston (2005) discusses the need for consistency throughout the intelligence community through both basic and advanced training. He notes that although resources have been allocated to formal training programs, formal evaluation mechanisms are largely absent. Even in courses where student evaluations are conducted, they lack standardization, and are treated as formalities rather than tools to improve course efficacy. However, performance measurement can improve Intelligence Community training, and can be used to assess the difference between "ideal" versus "actual performance" (Johnston, 2005).

Feedback for intelligence, law enforcement, and homeland security training courses traditionally relies upon end-of-course evaluations. These evaluations are designed to assess the materials, or the instruction, or the instructors. Disentangling the cause-effect possibilities of the training intervention can be difficult, as many assessment mechanisms suffer from poor design and implementation problems (National Research Council, 2004). In addition, most training course evaluations fail to review the qualifications and experience of instructors, the training delivery methods, and the long-term results of the training, which are perhaps as significant as reviewing the quality of curricula (National Research Council, 2004).

Objective assessment of strengths and deficiencies in law enforcement intelligence analysis training courses has several associated benefits, such as developing training programs and ensuring that skills are transferred to the work environment (Derbentseva et al., 2010). An additional source of valuable information is whether students retain and apply the training within their workplace. Few law enforcement intelligence courses assess this, even though it would be important to gather data from workplace supervisors in order to measure the training's long-term effects on the activities and performance of employees (Johnston, 2005).

In summary, the goal of training program measurement should be twofold: to ensure that the training course, as an intervention, succeeds; and to evaluate student perspectives about potential course improvement. So far, in intelligence training, using pre-intervention performance measures accompanied by post-intervention measures has been minimal.

TEACHING CRIMINAL JUSTICE WRITING

Communications within the field of criminal justice, and specifically writing as a primary communication method, are significant to both academia and the intelligence world. Review of the literature reveals that writing competency is an area that many criminal justice departments avoid. Blowers & Donohue (1994) note that writing competency should be a focal point for universities and should be a primary concern of criminal justice faculty; yet some faculty avoid writing-based exercises and assessments primarily because of the labor-intensity of the resulting assignments (Pfeifer & Ferree, 2006). Similarly, students tend to avoid writing-intense classes because they are fearful about their own writing abilities and fail to appreciate the personal development aspects of such courses (Blowers & Donohue, 1994). Numerous studies show, however, that instructors and professors who coach students in the writing process are imminently more successful than those who simply adjudicate the completed product (Blowers & Donohue, 1994; Singer & Walvoord, 1984). Such writing-intensive criminal justice courses should be designed to educate students about the ongoing, iterative process of writing - that good writing skills emerge from practice, feedback, and rewriting.

Writing instruction must go beyond producing research papers. Writers must be able to strategize, both linearly and recursively: "collecting (unconsciously through the senses), focusing (locking onto particular bits of information that have particular meaning to the writer), ordering (fitting information of interest with previously known information), drafting (talking to the self when writing), and clarifying (sharpening the thinking by reviewing and rewriting)" (Gladis, 1991, p. 237-238). Skilled writers "spend much of their time considering schemes To Do and To Compose; unskilled writers concentrate on

schemes To Say… being clear about the overall strategy and refining one's concept of the audience offer a way to bridge the gap between speech and writing." (Sinclair, 1984, p. 3)

Literature encourages the use of peer review (Blevins-Knabe, 1987; Blowers & Donohue, 1994) as a supportive method of teaching and learning writing skills. Students quickly learn that the instructor is not an anomaly, or "a unique…hypercritical audience. Often students dismiss comments on their written work as deriving from unusually high expectations that other audiences would not hold. Peer reviews involve students in a process of feedback and evaluation; in doing so, they help students learn to deal with criticism" (Boice, 1990; in Blowers & Donohue, 1994, p. 77). Students who review their classmates' work may begin to understand the similarities and differences in substance and polish of writing, and appreciate the need for careful review and correction of material prior to submission (Blevins-Knabe, 1987; Blowers & Donohue, 1994).

COMMUNICATING INTELLIGENCE

Writing and communication skills are listed amongst essential skills identified by intelligence managers. It is vital that analysts communicate effectively so that their conclusions and recommendations can be understood and acted on by management.

> Communication is the core of our business. An analyst has to have those communication skills. It doesn't matter how smart the person is, if you can't communicate it will be very, very difficult. Intelligence is not done for personal benefit, it is done for someone else's benefit, and an analyst has to be able to communicate; it's a critical element. (Interviewee) (Derbentseva et al., 2010, p. 23)

Intelligence writing consists of thinking critically and communicating those thoughts; of anticipating another person's needs in order to craft a response. Similar to most scientific methods of writing, Intelligence analysis includes hypotheses, analyses, judgments, and conclusions. By posing the appropriate questions, and by observing, connecting, synthesizing, concluding, and refining, an analyst will better understand and more effectively write about an issue, topic, or event.

Important issues for intelligence consumers include the quality and the value of intelligence products. Intelligence analysis "success" can be determined through examining both the intelligence process and intelligence product (IALEIA & GIWG, 2013; Derbentseva et al., 2010; D. T. Moore et al., 2005; Osborne, 2006). "Assessing the 'intelligence product' implies assessing the value of analytic conclusions in meeting consumer needs…Evaluating the 'intelligence process' implies assessing the soundness of methods used to arrive at analytic conclusions, including the train of logic, quality of information, soundness of assumptions, consideration of alternatives, and clarity of communication." (Derbentseva et al., 2010, p. 25)

One of the primary difficulties in assessing the quality and effectiveness of intelligence writing is parsing out the purpose for the intelligence product. Determining the properties of the task, the audience, time constraints, and the quality of information available (Derbemtseva et al., 2010) are matters that are largely left up to the intelligence analyst to decipher. In some circumstances, summary reporting of the facts at hand may be appropriate; in other cases, the analyst must make judgments based upon the evidence at hand

and draw conclusions. Factors that contribute to or mitigate the complexity of an intelligence product include: the topic; the amount of forecasting necessary to fulfill the required assessment; the amount and quality of relevant information available; the timeline for completion; the analyst's expertise and knowledge of the topic; and the type and form of analytic assessment necessary (Derbentseva et al., 2010).

At the federal and international levels, one of the main difficulties with intelligence analysis has been attributed to the analytical stage of analysis, i.e. interpretation of meaningful information (Bar-Joseph, 2010; Derbentseva et al., 2010); this problem is significant within the fusion center environment, as well. The message conveyed through intelligence analysis is largely dependent upon language, word choice, and the conclusions drawn by the analyst. Communicating levels of confidence and uncertainty are key factors within intelligence. Unlike traditional law enforcement reporting, sources must be referenced and judgments clearly justified (Derbentseva et al., 2010).

Methods

PROGRAM OVERVIEW

Fusion center analysts require advanced training to perform job duties. The Department of Homeland Security-certified, 125-hour Intermediate Fusion Center Analyst Training (IFCAT)[1] program was developed following a needs assessment, a nationwide survey of the job tasks and responsibilities of fusion center analysts (California POST, 2008), and meetings with subject-matter experts from throughout the country. The program (see Appendix A) was designed based upon recommendations of working analysts and subject-matter experts. When building the course in 2008, initial discussion centered on defining an advanced set of skills and competencies[2]. Without standards defining "advanced" training in 2008, however, curriculum developers opted to define this set of courses as a tier above the basic law enforcement intelligence analysis courses already in existence.

The Intermediate Fusion Center Analyst Training Program uses Bloom's Taxonomy as an overarching framework to evaluate and rate student progress through the course. Intelligence analysts must apply knowledge, solve problems, create and integrate ideas and reclassify information into various schemas, and demonstrate proficiency at logic, evaluating value, and judging quality (Bloom et al., 1956). These are developmental objectives; students demonstrate progress in varying degrees of ability. By the end of the training series, students are expected to demonstrate the entire range of cognitive behaviors, from basic knowledge and comprehension to analysis, synthesis, and evaluation.

The ten cohorts represented in this study attended IFCAT as the program was offered within their region between late 2009 and early 2011. Each regionally-based cohort proceeded through the set of four classes as a group. The 171 analysts admitted to the IFCAT during this study period were required to have previously attended a basic-level intelligence analysis training course prior to participation. Current assignment to a fusion center, which was one of the initial prerequisites for participation, was revised to include

1 The competencies identified in the *Common Competencies for State, Local, and Tribal Intelligence Analysts* (2010) are incorporated into the enabling objectives of the program.

2 These enhanced standards are part of *The Analyst Professional Development Roadmap* (Global, April 2015).

those analysts and officers who worked either in fusion centers or in multi-agency information-sharing settings. Each student was required to have the permission of their fusion center or intelligence unit supervisor in order to participate in the classes.

The IFCAT was designed to be a combination online and in-class program series. This mixed delivery was adopted due to the limitations and constraints of students working full-time in a professional environment. Learning objectives were based upon professional analytic and intelligence standards; curriculum mapping assessed links between objectives and the curricula. Designed using the premises of Problem-Based Learning, progress through the four classes was evaluated through the use of pre- and post-tests, problem-solving exercises, and demonstrations. Mastery of learning objectives and the quality of students' performance were measured using rubric assessment tools. Three pilot programs assessed the intersection of learning objectives and student outcomes. The data analyzed in this study was provided by the primary IFCAT writing instructor responsible for course evaluation. These data represent all students signing up for the Communications Skills and Analytic Writing course, which was the third of four classes in the IFCAT series.

It is important to acknowledge the significant attrition from the IFCAT series. As students proceeded through the courses, a significant number of students were unable to continue and complete the work for a variety of professional or personal reasons. Within the targeted time period, 318 students began the four-course series; only 171 (54%) enrolled in the communication skills and analytic writing portion of the program. Out of the 171 students enrolling, 151 submitted a majority of assignments. Completion of the pretest and post-test were not mandatory to successfully pass the analytic writing course; of those 151 students, 97 (57%) completed the pretest and 86 (50%) the post-test. Those 151 students enrolled in the final course in the series.

Despite enthusiastic recommendations and extremely positive feedback from students, intelligence managers, and fusion center personnel, grant funding for the IFCAT program ended in 2012 and was not renewed.

INTELLIGENCE WRITING

This course provided students with an introduction to intelligence writing and production "best practices" from the perspective of the law enforcement, fusion, and national intelligence communities. Guidance was given on the purposes of writing intelligence products and assessments and the broad uses of those products. The relationships between investigators (information collectors), intelligence analysts (information consumers and synthesizers), and decision-makers (intelligence consumers) were highlighted. Instruction stressed how these relationships rely on relevant, concise, accurate, and timely reporting and precise analytical writing.

This 33-hour, six-week instructor-assisted online presentation was designed to build upon topics addressed in basic intelligence analysis training courses, as well as the first two classes within the IFCAT program (see Appendix A for details). The purpose of this training was to significantly improve the writing skills of intelligence analysts. Analysts produced four practice writings:

1. Evaluate and peer-review a finished intelligence product.
2. Summarize a complicated document, conduct research, and write an analytic report.
3. Write a brief summary of the same information to a different audience.
4. Conduct research and write an intelligence assessment on a topic, issue, or threat identified by the analyst's fusion center.

Each practical writing assignment built upon the previous activity. One of the more unique elements of the IFCAT Program was the requirement that students identify a topic, issue, or threat of interest to their fusion center, conduct research, and prepare a finished intelligence assessment. Intelligence assessments were released within the analyst's fusion center and, depending upon the appropriateness of the target audience, to intelligence community members.

ASSESSING WRITING

In selecting training assessment methods, the primary goal is self-examination and improvement for the benefit of the students. Measures must be realistic and manageable within the confines of the course and available resources; they must also result in relevant, useful feedback. Direct methods—requiring demonstration of skills—in conjunction with indirect methods, such as surveys, provide greater depth and validity to the course assessment. In combination, these techniques provide a more comprehensive view of the course strengths and weaknesses. Objective evaluation of the data can indicate depth and breadth of knowledge obtained, as well as any lingering weakness in performance. The IFCAT writing course uses several strategies to evaluate effectiveness: course-embedded assessment techniques, including pre-tests and post-tests and grading rubrics; and an end-of-course student survey.

While the writing process varies from writer to writer, most writing can be seen as comprised of four basic stages: collecting, organizing, drafting, and revising (Honey, 2010). The rhetorical model of writing places primary emphasis on audience, organization, development, transition, and support for conclusions. Instructors provide learners with specific, meaningful, and supportive feedback designed to improve their writing skills. The approaches taken for evaluation of written reports require that the writer reflect on the writing, concentrating on content versus style or punctuation, using questions to cause writers to rethink and revise, and avoiding over-correction. The assignments given, and the responses to those assignments, are focused on teaching the student to write, with the primary goal of being understood.

Course-embedded assessment is used within the class environment to review students' knowledge and skills. Several strengths of course-embedded assessment include: relevance and authenticity to students and faculty, customizability, and low cost. In addition, students are likely to participate and are motivated to do well. In addition to student evaluation, such assessments can be used to validate program outcomes. (Academy of Criminal Justice Sciences, 2011; Stassen et al., 2001)

The pre-test/post-test evaluation method collects data at the beginning and end of a course in order to compare change between the two points in time. Results can be used to identify areas of skill deficiency and to track improvement within the assigned time frame.

Comparisons can be made between groups of students or within a specific group of students. However, "care should be taken to ensure that the tests measure what they are intended to measure over time (and that they fit with program learning objectives) and that there is consistency in test items, administration and application of scoring standards." (Stassen et al., 2001, p. 44; California State University - Bakersfield, 1999; Honey, 2011)

Student surveys are the most widely used forms of assessment with training courses, as they are usually short and easily administered. Students are asked to provide their perspectives about their knowledge, or the quality of their course experience, in open-ended or close-ended responses. Surveys and interviews can be handled in a variety of ways – questionnaires, interviews and focus groups; online, verbal, or hard copy formats. Some cautions exist, however, with surveys; depending upon the population and sample, the responses may not be representative. In addition, opinion research can be misleading; the quality and objectivity of the survey largely determines whether the results will be useful. (California State University - Bakersfield, 1999; Stassen et al., 2001)

A rubric is an assessment tool used to remove much of the subjectivity within performance assessment. Rubrics provide uniform sets of precisely defined criteria or guidelines used to judge work and results for specified tasks (see Appendix C). The rubric organizes and clarifies scoring criteria. A good scoring rubric helps the instructor define excellence; demonstrates to others what constitutes excellence; helps individuals assess their own work; communicates goals and results to others; assists writers with achieving excellence; and assists raters in being accurate, unbiased and consistent in scoring. At the very least, a rubric defines what an acceptable level of performance is and what constitutes unacceptable performance. (California State University - Bakersfield, 1999; Stassen et al., 2001; Honey, 2011)

A rubric has several dimensions, each of which contributes to usefulness. These components include one or more dimensions on which performance is rated, definitions and/or examples that illustrate the attribute(s) being measured and a rating scale for each dimension. Students are required to use the rubric to review their work and make any necessary changes. Knowing in advance what constitutes above standard performance encourages the individual to produce quality work prior to supervisory review.

As an example, the Intelligence Report Assessment Rubric is designed to provide general feedback on a number of criteria that analysts' supervisors have determined to be important in the creation of an effective intelligence report. The comments section of the rubric is intended to add any pertinent details that are not captured in the components of the rubric itself. The rubric is quickly and easily customizable to best suit the needs of both the individual and its intended purpose.

Several items are used to evaluate student performance and progress throughout the class. At the beginning of the writing course, as one of their first graded assignments, students complete a brief Self-Appraisal survey (see Appendix B) disclosing their personal writing strategies. Students are surveyed about their views of writing: How much work time is spent writing? Do they find writing to be an enjoyable task? Is writing easy, or difficult? In addition to highlighting areas where students need attention and improvement, students' answers to these questions illustrate their attitudes and experiences with writing. Identification of writing strengths/weaknesses is empirically based (Flower, 1993); composition

researchers asked both good writers and bad writers what they thought about before, during, and after writing. Flower's research results, in addition to several items based upon literature review (Honey, 2011) are reflected in the twenty "good" and "bad" strategies included in this survey. In theory, the ability to complete writing assignments results from a number of strategies that analysts have employed, either successfully or unsuccessfully, for a number of years.

In addition, a pre- and post- test writing exercise using the Intelligence Report Assessment Rubric provides objective corroboration of the efficacy of the course. The holistic scoring process allows evaluators to rank writing samples by using a set of papers as benchmarks to represent various points on the rating scale. These norming papers then become the reference points for evaluating all of the papers in the group. For purposes of this course, an eight-point scale was used, with a "1" score being the lowest possible value, and an "8" score being exemplary.

Figure 1

Below Standard	Approaching Standard	Meets Standard	Exceeds Standard
1 2	3 4	5 6	7 8

The table above presents the general description of score values; the scoring rubric is attached as Appendix C. In this analysis, each paper was read independently by two readers[3]. Neither reader knew the score assigned by the other grader; the assigned scores were then averaged to get a single score for each paper.

These writing exercises were graded independently by two instructors; pre-test and post-test evaluations were formed by averaging these grades. To establish the reliability of the scoring procedure, descriptive statistics for each score rater and also rater score correlations were computed. Discussion of the transformation process is presented in Appendix D.

Figure 2

Descriptive statistics on pre-test and post-test; Reader 1 (r1) and Reader 2 (r2)

	N	Minimum	Maximum	Mean	Std. Deviation
pretest_r1	97	2.00	8.00	5.8155	1.15484
pretest_r2	97	3.00	8.00	5.8392	1.07668
post-test_r1	86	3.00	8.00	6.2831	1.18024
post-test_r2	86	4.00	8.00	6.2698	.99091
Valid N (listwise)	86				

Analysis of the descriptive statistics for the pre-tests and post-tests indicates that the average ratings of Readers 1 and 2 were quite similar. The mean scores for Reader 2 were slightly higher than Reader 1 on the pre-test and slightly lower than Reader 1 on the post-test. The correlations between Reader 1 and Reader 2 on both the pre-test (.943) and the post-test (.952) are statistically significant and would occur by chance in less than 1 in

3 Both of the readers have Master's Degrees in Psychology and are professional, experienced essay readers.

1,000 instances. The correlation between Reader 1 and Reader 2 is only slightly higher on the post-test than on the pre-test.

Finally, information from students' final course evaluations provides context to understand progress and perceptions of the training material.

Results

STUDENT EXPECTATIONS

> Writing shows up as another word for **intimidation** in my thesaurus. I am not a "writer" by any means and struggle consistently in this area largely in part because I don't have enough education and lack of experience (sic). It's difficult to master anything let alone become "comfortable" if one is not actively practicing. *(IFCAT student)*

The analyst quoted above personified many of the students enrolled in the intermediate fusion center analyst training program. Since students' expectations were solicited at the beginning of the course as part of their self-introduction to their classmates, analysts admitted to their writing skills being unpolished, and underutilized, in their fusion centers.

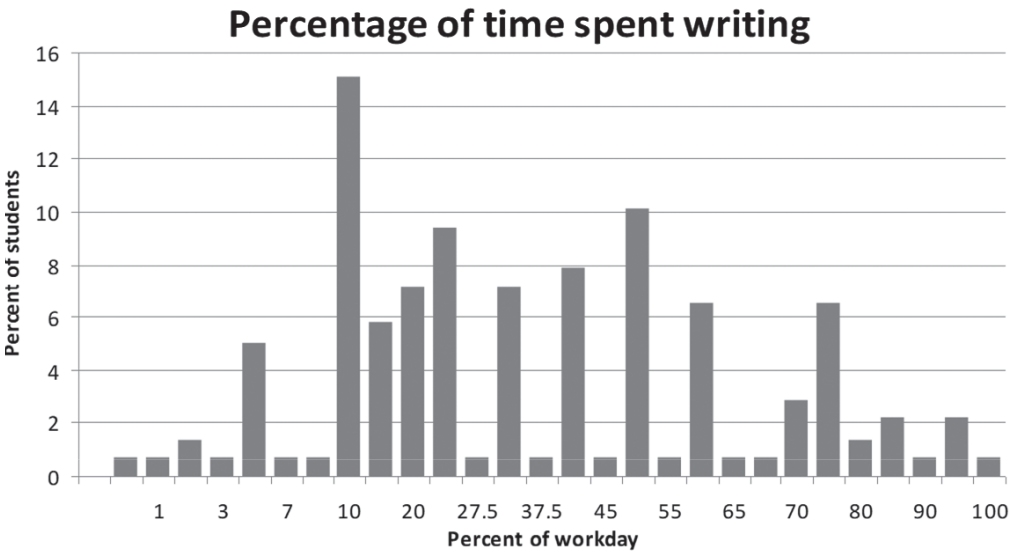
As a result, student expectations were high. Analysts hoped to gain experience and knowledge in organizing their thoughts, utilizing a standard framework for intelligence products; creating worthwhile intelligence products for field personnel; increasing their abilities to effectively articulate intelligence; and dissecting and organizing vast amounts of complex information for the preparation of concise analytical products. One analyst was succinct in her expectations: "I want to learn proficiency in report writing in order to produce a professional and informative document." Other students commented:

> In the past, I have had limited opportunity to learn analytical writing techniques. I anticipate that the lessons…will enhance my abilities in this area. In my current position, I am not required to generate analytical products; however, having the capability to do so would be a benefit to myself and my co-workers.
>
> I would like to learn how to better organize the information that I receive and put out a intelligence product that would assist others in their jobs.
>
> My course expectations are to learn how to organize my thoughts and to learn how to write with confidence on subjects.
>
> My expectations….to obviously become a better writer overall, but specifically to become a better summary writer. I have trouble summarizing my reports because I don't want any details to be left out. Since I don't do a lot of analytical writing in my current position, I haven't had that much practice in doing so.
>
> My expectations for this course include learning to become a more concise writer. I sometimes feel that I become long-winded during my assessments or explanations. I also hope to learn additional writing styles by reading my fellow classmates assignments. I am a very visual learner and feel that when I have a 'template' or 'example,' I can learn much quicker. Overall, I am looking forward to this course.

SELF-APPRAISAL: TIME SPENT WRITING

The graph below summarizes the percentage of their daily work day that students reportedly spend writing.

Figure 3



Values range from 0% to 100% of a typical workday, with the mean amount of time approximately 1/3 of the workday (36.2%). Students report a modal value of 10% (21 students, representing 15% of the responding analysts). Three-quarters of the students reportedly spend from 0-50% of their workday engaged in writing.

ATTITUDES ABOUT WRITING

While analyst attitudes toward writing differed fairly dramatically among cohorts, their perspective about writing tends to be slightly positive as an aggregated group[4]. Overall, about 44% of the students regard writing as a positive activity; about the same number view it as a neutral activity; and about 12% dislike writing.

Figure 4

Attitude toward writing		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Enjoy**	61	40.4	43.6	43.6
	Neutral	62	41.1	44.3	87.9
	Dislike	17	11.3	12.1	100.0
	Total	140	92.7	100.0	
Missing	System	11	7.3		
Total		151	100.0		

4 While this may be due to sampling fluctuation, we can surmise that differences could reflect non-random differences in cohort composition, such as educational background, professional experience, regional trends in analyst hiring practices, etc.

In a similar vein, more than a third of analysts in the course perceive writing to be a difficult task (37.8%). This is surprising, considering that law enforcement intelligence analysis is based largely upon written communication. However, dislike of writing does not necessarily equate with poor writing ability; many "good" writers struggle with the challenge of producing on demand and dislike the pressure of the process. Other analysts may enjoy writing and find it to be "easy" yet be judged to be less effective writers.

Figure 5

Ease or difficulty of writing		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	**Easy**	84	55.6	62.2	62.2
	Difficult	51	33.8	37.8	100.0
	Total	135	89.4	100.0	
Missing	System	16	10.6		
Total		151	100.0		

WRITING STRATEGIES

When answering this survey, individuals were instructed to identify which strategies they utilized. If they indicated that they used a strategy, it was coded as "1". If they left the strategy blank it was coded "0". Taking the mean of responses identifies the application of each strategy as a group. As the mean value approaches "1" it indicates high use of the strategy by the intelligence analysts, and as it approaches "0" it indicates low use of the strategy.

The following table identifies which strategies have been previously identified in the literature (Flower, 1993; Honey, 2011) as assisting good writing (G), and those that detract from it (B). The mean value column indicates the use of each strategy by intelligence analysts as a group; standard deviation is also included.

Figure 6

Summary of findings – Self-Evaluation n=*151*

Good/ Bad	Writing Strategy	Mean	sd
	When you start to write, do you:		
G	Start writing quickly	.27	.444
G	Reflect on the topic for some time before beginning	.77	.424
B	Get the entire report/document organized before you begin	.33	.471
B	Start writing by drafting a beginning paragraph	.62	.487
B	Begin each paragraph with a topic sentence	.27	.444
G	Write the easiest parts first	.31	.462
	As you write, do you:		
B	Generate the complete report/document in a single sitting	.22	.417
B	Start at the beginning and work through to the end	.48	.501
G	Write recursively, jumping around in the report/document	.42	.495
G	Develop an outline of ideas and interrelationships before writing	.49	.501
B	Stick to your initial plan	.03	.182
G	Modify your plan as you write	.85	.356
	When you write, do you:		
G	Begin by analyzing your audience	.39	.488
G	Begin with a specific purpose	.80	.400
G	Organize your writing to address audience and purpose	.61	.488
	After you finish writing, do you:		
G	Revise and edit your writing for mechanical correctness (e.g., punctuation and grammar)	.93	.253
G	Revise and edit your writing reconsidering your audience	.47	.500
G	Revise and edit your writing for organization and development	.81	.396
G	Revise and edit your writing to strengthen conclusions	.68	.469

In totality, these survey results demonstrate that many of the strategies identified by composition theorists as necessary for good writing (Flower, 1993) are not consistently used by intelligence analysts.

The first set of questions involves the initial launch of the intelligence plan and examination of the structure of the intelligence piece. While few intelligence analysts are quick to put pen to paper (or, nowadays, fingers to keys), 77% report that they reflect on the topic before beginning, which is a good strategy. Only one quarter of the students start writing quickly, also a good strategy; too long a delay makes the task appear more difficult (Honey, 2011). If writing a very brief intelligence summary, it is best to immediately indicate a position; however, longer reports allow for more variety and diversity.

Overly structuring an intelligence piece prior to commencing—focusing upon organization, a beginning paragraph and topic sentences—are, surprisingly, bad strategies.

One-third of the analysts completely organize their report before beginning. Honey (2010) notes that as intelligence analysts write,

> their understanding of the topic and their outlook usually changes. To lock into a plan and leave it unchanged is a poor strategy. This is particularly true when, as intelligence analysts, we are continually identifying new and novel information. The investigative process is iterative, with new information either confirming or disconfirming previously held notions. If we refuse to acknowledge this new information and fail to develop an evolving understanding of it, we will misinterpret the topic under study or investigation and generate incorrect conclusions.

While, intuitively, it seems to be logical to start with a beginning paragraph, this strategy assumes writers start at the beginning. Beginning paragraphs with a topic sentence is actually situational--sometimes it is a good idea and sometimes it is not. As a general rule, the shorter the report the more important is a topic sentence. Instead of writing a complete beginning paragraph, researchers recommend jotting down ideas and listing possible hypotheses. 31% of the class indicated that they write the easiest parts first, which is a smart strategy to launch the writing piece—to focus on that which is easiest.

Attempting to write a complete document in a single sitting is usually not a good idea. In fact, it is likely impossible if the target document is complex or lengthy. The students generally agree with this as only 22% indicated they do this. Starting at the beginning is also a bad strategy, and half of the students agree; 48% indicated that they start at the beginning and work through.

Research has shown that writing is recursive rather than linear (Honey, 2010); that is, good writers jump around as they write, modifying, changing, and expanding as they go. However, only 42% say they write recursively and 58% indicate that they do not. Developing an outline of ideas and interrelationships is definitely a good strategy that only half of the analysts practice. Ninety-seven percent of the students agree that sticking dogmatically to an initial plan is usually disastrous. Eighty-five percent of the students modify their writing plan as they proceed, while only 15% indicate that they do not.

The next set of questions focus on analyzing audience and purpose and tailoring presentation of material to the appropriate clients. While quality intelligence products are largely dependent upon type, quantity, and quality of information available, analysts must translate information into actionable reports for line officers and executives (Dorn et al., 2009). Composition theorists agree that it is vital to analyze and know the audience. Different audiences have different information needs, and if not acknowledged, clarity and communication suffer. In intelligence, purpose and audience drive production, determining whether a summary, a briefing, or an intelligence assessment is necessary. Yet only 39% of the students indicate that they began by analyzing audience. Eighty percent mention that they considered purpose of the writing assignment.

Sixty one percent of the students organize their writing to address audience and purpose but only 55% indicated that they formatted their writing with a plan in mind. Good writers use textual considerations to their advantage. Summaries benefit from the use of bullets and tables while longer documents favor descriptive narrative. Similarly, the use

of underlining, bold, and italics can greatly ease the readers' burden when reading intelligence reports.

Editing and revising are critical to good writing. Regarding mechanical correctness, 93% of the students edit and revise to improve grammar, punctuation, and word choice; only seven percent do not. Only 47% of the students edit to ensure proper consideration of audience, with 53% skipping this step. This is problematic, as consideration of audience is crucial when deciding what information to include and what to exclude from a document. Eighty-one percent of the students review and revise for organization but only 68% revise and edit to strengthen conclusions.

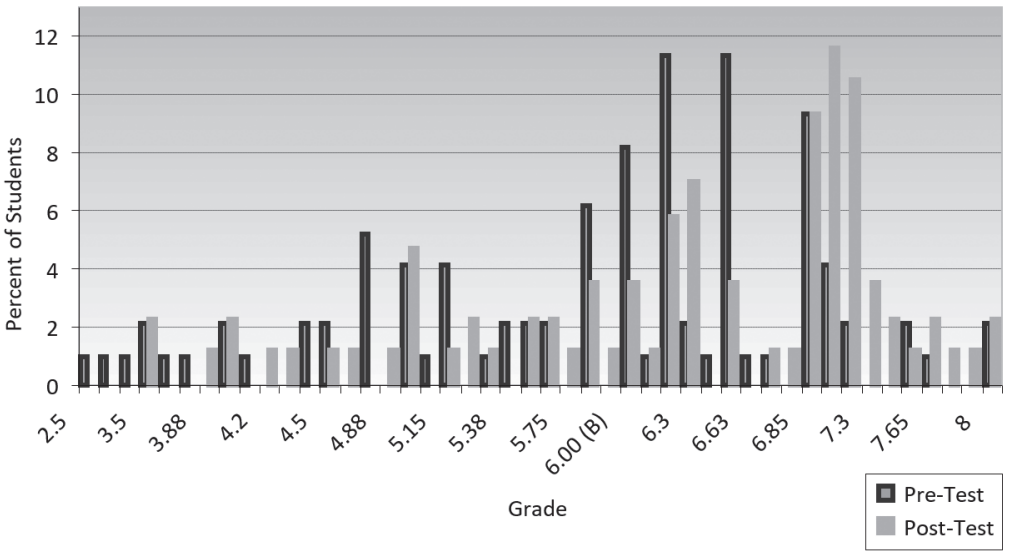
STUDENT WRITING RESULTS

Comparison of Pre- and Post-test Performance

Analysis of pre- and post-test results (see Appendix E for frequency tables) indicates that the average performance of all students on the Pre-test is in the "Meeting Standard" category on the Scoring Rubric. The Post-test mean, while falling into the "Meeting Standard" category, is slightly higher.

Figure 7

Change in Writing: From Pre-Test to Post-Test



Analytic Significance

In reviewing changes in scores, the question arises: are the changes statistically significant, or can they be attributed to chance? Are the two variables related, and what is the significance of the difference between the means?

Figure 8

t-test of score difference between pre-test and post-test

GROUP STATISTICS

	N	Mean	Std. Deviation	Std. Error Mean
pre-test	97	5.828	1.100	.1116
post-test	86	6.277	1.073	.1157

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig. (2-tailed)	t	df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.001	.973	2.79	181	.006	.449	.161	.131	.767
Equal variances not assumed			2.79	179.34	.006	.449	.161	.132	.766

Computing a t-test of score difference between pre- and post-test reveals that the results are significant and non-random (t=2.79). Analysis of pre-test and post-test writing samples indicates that the .45 mean difference between pre- and post-class writing ability is statistically significant (.006).

However, can we draw the conclusion that students' writing improved? And was this change both statistically and substantively significant? The difference of .45 on a scale of 1-8 represents less than a letter grade change in writing performance, which is not a considerable improvement in writing ability. In addition, eleven fewer students took the post-test than the pre-test; the dataset did not include individual-level data to eliminate these students' pre-test scores. Thus, the results could be skewed if those students' writing skills were below average in comparison to the rest of the population; their inclusion in the pre-test mean might make the training course appear to be more effective than it really is. Therefore, any conclusions about the effectiveness of the training must be made cautiously.

Discussion

These analyses provide several noteworthy results about the intelligence writing program and about the methods used to assess student progress. Perhaps as significant as the results is what the study does not reveal about teaching, and learning, intelligence writing skills.

1. **There is a high and significant inter-rater reliability in the procedures used for course evaluation.**

   Methodologically, the evaluation process for this writing course is scientific, thoughtful, and well-supported by the literature. The class was designed

based upon a needs assessment and consultation with subject matter experts and intelligence analysts from the federal, state, and local communities. Several pilot classes were used to compare learning objectives with student evaluations, and the results were applied to improve course materials and content. A simultaneous curriculum audit by the Department of Homeland Security in 2009 provided specific comments about the quality of materials and relevance of the assignments; that feedback was incorporated into a course update prior to formal delivery to the intelligence analyst community.

2.Assessment of the students who participated in the pretest and post-test reveals an improvement in class writing.

Based upon analysis of the currently available data, the hypothesis initially appears to be supported; however, analysis of additional classes should be done to increase the sample size in order to draw definitive conclusions.

3. However, significant attrition between enrollment and post-test may have influenced the results.

This attrition becomes problematic in accurately interpreting the results. Did the writing skills of students who avoided the pretest and/or post-test differ significantly from those students who completed the assignments? Are the 20 students who failed to complete the writing course significantly different in writing skills and abilities then those who completed the course? Depending upon data collection, tracking, and retention methods, further analysis could be conducted to investigate and resolve these questions.

4. While students, overall, exhibited improvement in their writing ability, the cause-and-effect relationship is unclear.

Is the improvement in writing quality due to the course, and students' ability to build upon the basics that are taught throughout the class? Or are the results independent of time, teaching, and feedback provided by the instructors? The compressed timeframe for the course results in a significant number of students progressing through several assignments prior to receiving initial instructor comments.

One possible explanation is that student improvement might be an artifact of the attention provided to their writing during the course. The "Hawthorne effect" describes the belief that performance will improve if it is measured and is known to be being measured, regardless of external factors or injects. Simply in response to the fact that they are being studied, subjects may modify an aspect of their performance. Additional social science research suggests that people might take on pleasing the experimenter as a goal. (Gottfredson, 1996)

Another possibility is that educating students about the structural aspects of writing might indeed cause them to be more attentive to their writing style and structure. Disentangling the cause-effect relationship between these factors and improved writing style can be addressed through additional research and analysis.

5. **Online delivery of the course, and the use of an e-based platform, affected adult learners in different ways.**

   Teaching adults, or andragogy[5], presents unique challenges within the training environment. In developing the series of classes for IFCAT, program managers believed that intelligence analysts would be familiar with electronic editing functions, posting to online discussion groups, and uploading documents to an internet-based platform. Yet our society's easy familiarity with computers and the internet has lagged in portions of the law enforcement intelligence community. Unfortunately, use of the various technologies seemed inconsistent across the population. Electronic editing functions, such as track changes and inserting comments, were foreign to a substantial portion of the students. Instead of enhancing clarity and feedback (McCabe, Doerflinger, & Fox, 2011), and improving the quality and convenience of editing and responding to comments and changes, approximately one-fifth of the analysts were noticeably reluctant to use and engage in online technology. Since the assignments required the use of electronic editing and online postings, some students were pushed out of their comfort zones; the antipathy toward the delivery modality may potentially have affected the quality of their written assignments.

6. **A diverse instructional cadre could affect student learning during the writing portion of the program.**

   Most law enforcement intelligence training programs utilize a variety of instructors, including active or retired intelligence analysts from the U.S. intelligence communities, fusion centers, the military, law enforcement, and academia. Initially, the IFCAT writing course began with two primary writing instructors who had coordinated their feedback and grading to ensure consistency. As the number of concurrent courses increased, additional instructors were added; coordinators frequently divided the classes between multiple instructors. This influx of graders may have been beneficial, neutral, or detrimental. Coordinating grading standards and ensuring that different instructors are employing similar instructional techniques would decrease any unevenness in course delivery. A formal instructor development program, as well as training instructors to properly and consistently use the various scoring rubrics, involves significant time and financial commitment.

7. **Course assessments completed by students should be compared with the results of this research.**

   > The exercises were well-planned and required analysts to implement critical thinking.
   >
   > Instructors were fantastic and extremely knowledgeable of the information. Great networking as well.
   >
   > The writing of the intelligence assessment was most valuable. This skill will allow me to drastically improve my contributions to the

5 A term coined by Malcolm Knowles to describe the art and science of adult learning.

intelligence community in my state.

I have not had exposure to writing assessments, so this was a great learning opportunity.

The most valuable part was the capstone project. It forced us to write a product the agency could use while learning writing techniques.

This course improved my ability to write and focus my thoughts and my analysis.

(Excerpts from student evaluations)

While student evaluations provide a richness that quantitative data omits, researchers should be cautious about the utility of student evaluations, used alone, to assess a course's strengths and weaknesses. Many instructors believe that writing-intensive courses are viewed as less popular among students, and that course evaluations will be unfavorable (Boice, 1990). Results from additional researchers are mixed. Some researchers disagree with Boice's assessment (Blowers and Donohue 1994), while others suspect that the pertinence of student end-of-course evaluations is limited. One concern is that student evaluations likely reflect their rating of the instructor rather than the course content (J. T. Richardson, 2005). "Although traditional end-of-course evaluations are intended to assess the value of the course content, students often do not have the capacity to respond to those questions and ultimately they evaluate only what they do know—what they liked or did not like about a faculty member" (Pelfrey & Pelfrey, 2009, p. 60) rather than judging the quality and efficacy of the course material.

8. Are the effects significant enough that they remain after significant time has passed?

While a six-week course focuses intensively upon writing and intelligence analysis, the real test is whether students maintain knowledge and skills after returning to their professional positions. Without substantial reinforcement, it is hypothesized that the effect of writing training courses may become insignificant over time. An additional evaluation of the efficacy of the writing class, after six to twelve months, might substantiate or weaken the course's pre-test/post-test results. A survey of analyst managers, or an additional post-course writing sample, could provide the information necessary to judge whether the changes were both statistically significant and lasting. These two post-evaluation perspectives were not obtained, but should be considered in future evaluations to determine whether long-term effects occur.

9. Further writing course curriculum development should include formal training for intelligence analyst managers.

A survey by Derbentseva, et al. revealed that managers lack standard procedures for evaluating the quality and efficacy of intelligence products. Management comments are largely limited to fact-checking and review of the analysis process; the result is a subjective, rather than an objective process that

varies between managers and directors. (Derbentseva, et al. 2010) Providing training to law enforcement intelligence managers may assist in defining significance and standards for intelligence publications and may reinforce the utility of the writing instruction received by intelligence analysts.

Conclusion

The writing component of the Intermediate Fusion Center Analyst Training Program was designed to provide intelligence analysts with the skills and strategies to write concisely and coherently. Analysts are taught to apply the analysis process to their writing in order to generate accurate results and conclusions. During the course they learn to produce written products that meet the needs of their audience. Once these skills are mastered, the analyst can effectively produce written products conforming to the analytic model preferred in intelligence assessment.

Self-appraisal surveys are completed by students within each class to identify individual writing strategies. Those self-assessment results indicate that a number of shortcomings identified in evaluations of intelligence analysis can be remedied through training. Two shortcomings are significant but can be resolved through training: (1) writers fail to appreciate and meet the information needs of the audience; and (2) intelligence analysts within fusion centers write minimally. These findings are supported by instructor feedback; frequently, instructors note that papers fail to contain the information needed by the target audience. The resulting documents do not contain information significant to the reader, which, in turn, discourages continuing readership of intelligence documents.

Formal course evaluations consist of pre-and post-test holistically scored essays and student surveys. Based on pre-tests and post-tests, students demonstrated a small, statistically significant improvement in writing at the completion of the course. Utilizing the results of surveys and following up with instructor feedback, we can conclude that this short-term, online intelligence writing course improved intelligence analysts' writing skills.

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Appendix A

Description from the Northern California Regional Public Safety Training Authority's (NCRPST) Intermediate Fusion Center Analyst Training Curriculum, 2010.

INTERMEDIATE FUSION CENTER ANALYST TRAINING PROGRAM (IFCAT)

This 125-hour intermediate analyst training program was developed following a nationwide fusion center analyst job task analysis and meetings with subject-matter experts from throughout the country. The program consists of four parts presented in either an online or classroom environment:

1. Analysis and Terrorism Prevention (online)
2. Critical Thinking and Analytic Techniques (classroom)
3. Communication Skills and Analytic Writing (online)
4. Strategic Analysis and Oral Briefings (classroom)

Each part is presented in an active learning environment to engage the learner to acquire, comprehend, and demonstrate knowledge of the cognitive abilities required of analysts. The course builds upon the learners' basic analytic training to broaden their proactive role in the intelligence analysis process. Students who successfully complete the Intermediate Fusion Center Analyst Training Program (IFCAT) are eligible to receive eight undergraduate/graduate-level semester units through Grand Canyon University (Phoenix, AZ). The classroom portions of the program are mobile and can be presented at the host's facility with a minimum of 20 students.

THE FOUR-PART PROGRAM

Part 1: Analysis and Terrorism Prevention

In this 40-hour online course, learners will be given instruction on terrorism and counterterrorism awareness, personal leadership, the key role of the Liaison Officer (LO) in building a network of field intelligence collectors, the role of the fusion center as described in the National Strategy for Homeland Security, the criticality of information sharing and teamwork, and the skills to apply innovative problem-solving methods.

Department of Homeland Security Certified (PER-285)

Part 2: Critical Thinking and Analytic Techniques

This 26-hour classroom course builds upon topics addressed in basic intelligence analysis training courses and Part 1 of this program. It is presented in an active learning environment using instructor-led discussion, video case studies, problem-based learning (PBL), and other learner-centered instructional strategies. Through participation in activities and case studies, the learner will demonstrate communication, personal leadership skills, effective analytic writing, information sharing, and building networks. The learner will illustrate comprehension of the ability to gather, process, analyze, and disseminate homeland security and other information, threat assessments, and public safety information on a national, statewide, and regional basis.

Department of Homeland Security Certified (PER-286)

Part 3: Communication Skills and Analytic Writing

This 33-hour online course is designed to build upon topics addressed in basic intelligence analysis training courses, as well as Part 1 and Part 2 of this program. The purpose of this course is to improve the writing skills of intelligence analysts. This will be accomplished by providing the learners with an understanding of the writing process and the strategies that drive that process. Learners will complete four practice writings:

1. evaluate a finished intelligence product;
2. summarize a complicated document, conduct research, and write an analytic report;
3. write a brief summary of the same information to a different audience; and
4. write an intelligence assessment.

The instructor will provide the learner with meaningful feedback designed to improve the learner's writing skills. Learners will receive instruction on the process of writing so that the product of their writing efforts will be clear, concise, and correct. This will involve teaching the analyst that writing is thinking, and by posing the appropriate questions and tasks for oneself (observing, connecting, synthesizing, concluding, refining, etc.), one will better understand and more effectively write about an issue, topic, or event.

Department of Homeland Security Certified (PER-288)

Part 4: Strategic Analysis and Oral Briefings

This 26-hour classroom course addresses effective oral briefing protocols and concludes with a capstone learning activity designed to measure the cognitive abilities required of intelligence analysts.

Department of Homeland Security Certified (PER-289)

Another unique feature of this four-part training program involves the creation of an agency-authorized intelligence product. Learners will ask their supervisor to identify a threat, issue, or topic of interest to their fusion center. Learners will then research and analyze the threat, issue, or topic, and will incorporate their analytic conclusions into a finished written intelligence product. They will also prepare and deliver an oral briefing on the intelligence product, both in the classroom and to their supervisor at the conclusion of the program, thus providing a concrete, relevant, and immediate benefit to the fusion center.

Appendix B

SELF-APPRAISAL SURVEY[6]

Instructions: This short exercise is intended to help you gain insight about how you feel about writing, to assist you in objectively evaluating your performance as a writer, and to help you identify the strategies on which you rely when writing. All answers are entered in the shaded boxes in the last column of the table.

Specific instructions:

Item 1: Enter a single percentage figure in the box to the right of the question

Item 2: Place a number "1" in the box that identifies how you feel about writing. Leave the other two boxes blank

Item 3: Place a number "1" in the box that identifies your attitude regarding writing difficulty. Leave the other box blank

Items 4-7: Place a number "1" in each box corresponding to a strategy that you use. Check as many boxes as are appropriate. You may check all, some, or none of the boxes for each item.

You will receive extensive feedback regarding how your class responded to these questions.

6 From the Northern California Regional Public Safety Training Authority's (NCRPST) Intermediate Analyst Writing Curriculum (Toomey and Bennett, 2010).

#	Question or Writing Strategy	Responses
1	**What percentage of your workday is spent writing? (enter % in box at right)**	
2	**In general, how do you feel about writing? (choose only 1)**	
	a. I enjoy writing	
	b. I am neutral regarding writing	
	c. I find writing unpleasant	
3	**Do you find writing: (choose only 1)**	
	a. Easy	
	b. Difficult	
4	**When you start to write, do you: (choose all that apply)**	
	a. Start writing quickly	
	b. Reflect on the topic for some time before beginning	
	c. Get the entire report/document organized before you begin	
	d. Start writing by drafting a beginning paragraph	
	e. Begin each paragraph with a topic sentence	
	f. write the easiest parts first	
5	**As you write, do you: (choose all that apply)**	
	a. Generate the complete report/document in a single sitting	
	b. Start at the beginning and work through to the end	
	c. Write recursively, jumping around in the report/document	
	d. Develop an outline of ideas and interrelationships before writing	
	e. Stick to your initial plan	
	f. Modify your plan as you write	
6	**When you write, do you: (choose all that apply)**	
	a. Begin by analyzing your audience	
	b. Begin with a specific purpose	
	c. Organize your writing to address audience and purpose	
	d. format your writing (e.g., use bold, italics, tables, bullets, etc.) with a plan in mind	
7	**After you finish writing, do you: (choose all that apply)**	
	a. Revise and edit your writing for mechanical correctness (e.g., punctuation and grammar)	
	b. revise and edit your writing reconsidering your audience	
	c. Revise and edit your writing for organization and development	
	d. Revise and edit your writing to strengthen conclusions	

Appendix C

General Writing Rubric

Category	Above Standard	Meets Standard	Approaching Standard	Below Standard
Organization	Information is very organized with well-constructed paragraphs.	Information is organized with well-constructed paragraphs.	Information is organized, but paragraphs are not well-constructed.	The information appears to be disorganized.
Quality of Information	Information clearly relates to the main topic. It includes several supporting details and/or examples.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples.	Information clearly relates to the main topic. No details and/or examples are given.	Information has little or nothing to do with the main topic.
Support for Position	Includes 3 or more pieces of evidence that support the position statement. The writer anticipates the reader's concerns, biases or arguments and has provided at least one counter argument.	Includes 3 or more pieces of evidence that support the position statement.	Includes 2 pieces of evidence that support the position statement.	Includes 1 or fewer pieces of evidence.
Evidence and Examples	All of the evidence and examples are specific, relevant and explanations are given that show how each piece of evidence supports the author's position	Most of the evidence and examples are specific, relevant and explanations are given that show how each piece of evidence supports the author's position	At least one of the pieces of evidence and examples is relevant and has an explanation that shows how that piece of evidence supports the author's position	Evidence and examples are not relevant and/or are not explained
Accuracy	All supportive facts and statistics are reported accurately.	Almost all supportive facts and statistics are reported accurately.	Some supportive facts and statistics are reported accurately.	Most supportive facts and statistics were reported inaccurately.
Sequencing	Arguments and support are provided in a logical order that makes it easy and interesting to follow the author's train of thought	Arguments and support are provided in a fairly logical order that makes it reasonably easy to follow the author's train of thought	A few of the support details or arguments are not in an expected or logical order, distracting the reader and making the work seem a little confusing	Many of the support details or arguments are not in an expected or logical order, distracting the reader and making the work seem very confusing
Transitions	A variety of thoughtful transitions are used. They clearly show how ideas are connected	Transitions show how ideas are connected, but there is little variety.	Some transitions work well, but some connections between ideas are fuzzy.	The transitions between ideas are unclear OR nonexistent.

From the Northern California Regional Public Safety Training Authority's (NCRPST) Intermediate Analyst Writing Curriculum (Toomey and Bennett, 2010).

Appendix D

Holistic Score Transformations (Honey, 2011)

In presenting holistic score test results, a linear transformation can be performed on the test scores. Holistic score values range from 1 to 8. However, traditional US grading systems are structured so that 60-69 is a "D," 70-79 is a "C," 80-89 is a "B," and 90-100 is an "A." Within this system, the distinction between a "D" and a "C" is typically the divide for unacceptable and acceptable. Within the holistic system, a score of 4 is regarded as moderately unacceptable, and a score of 5 acceptable. Given this, the holistic scores are translated to their corresponding percentage scores below.

	Holistic Score	Transformed Percentage Score
Approaching Standard	3	50
	3+	53
	4-	57
	4	60
	4+	63
Meets Standard	5-	67
	5	70
	5+	73
	6-	77
	6	80
	6+	83
Exceeds Standard	7-	87
	7	90
	7+	93
	8-	97
	8	100

* Note: The (+) /(–) scores in the holistic system are used by experienced readers in order to achieve more precise scores

Appendix E

Frequency distribution of scores on pre-test

		Frequency	Percent	Valid %	Cumulative %
Valid	2.50	1	.7	1.0	1.0
	3.25	1	.7	1.0	2.1
	3.38	1	.7	1.0	3.1
	3.50	2	1.3	2.1	5.2
	3.75	1	.7	1.0	6.2
	3.85	1	.7	1.0	7.2
	4.00	2	1.3	2.1	9.3
	4.15	1	.7	1.0	10.3
	4.38	2	1.3	2.1	12.4
	4.50	2	1.3	2.1	14.4
	4.85	5	3.3	5.2	19.6
	5.00	4	2.6	4.1	23.7
	5.13	1	.7	1.0	24.7
	5.15	4	2.6	4.1	28.9
	5.35	1	.7	1.0	29.9
	5.38	2	1.3	2.1	32.0
	5.50	2	1.3	2.1	34.0
	5.65	2	1.3	2.1	36.1
	5.85	6	4.0	6.2	42.3
	6.00	8	5.3	8.2	50.5
	6.13	1	.7	1.0	51.5
	6.15	11	7.3	11.3	62.9
	6.30	2	1.3	2.1	64.9
	6.35	1	.7	1.0	66.0
	6.50	11	7.3	11.3	77.3
	6.63	1	.7	1.0	78.4
	6.70	1	.7	1.0	79.4
	6.85	9	6.0	9.3	88.7
	7.00	4	2.6	4.1	92.8
	7.15	2	1.3	2.1	94.8
	7.50	2	1.3	2.1	96.9
	7.65	1	.7	1.0	97.9
	8.00	2	1.3	2.1	100.0
	Total	97	64.2	100.0	
Missing	System	54	35.8		
	Total	151	100.0		

Frequency distribution of scores on post-test

		Frequency	Percent	Valid Percent	Cumulative %
Valid	3.50	2	1.3	2.3	2.3
	3.88	1	.7	1.2	3.5
	4.00	2	1.3	2.3	5.8
	4.20	1	.7	1.2	7.0
	4.25	1	.7	1.2	8.1
	4.50	1	.7	1.2	9.3
	4.75	1	.7	1.2	10.5
	4.88	1	.7	1.2	11.6
	5.00	4	2.6	4.7	16.3
	5.15	1	.7	1.2	17.4
	5.30	2	1.3	2.3	19.8
	5.35	1	.7	1.2	20.9
	5.50	2	1.3	2.3	23.3
	5.65	2	1.3	2.3	25.6
	5.75	1	.7	1.2	26.7
	5.85	3	2.0	3.5	30.2
	5.88	1	.7	1.2	31.4
	6.00	3	2.0	3.5	34.9
	6.13	1	.7	1.2	36.0
	6.15	5	3.3	5.8	41.9
	6.30	6	4.0	7.0	48.8
	6.50	3	2.0	3.5	52.3
	6.70	1	.7	1.2	53.5
	6.75	1	.7	1.2	54.7
	6.85	8	5.3	9.3	64.0
	7.00	10	6.6	11.6	75.6
	7.15	9	6.0	10.5	86.0
	7.30	3	2.0	3.5	89.5
	7.35	2	1.3	2.3	91.9
	7.50	1	.7	1.2	93.0
	7.65	2	1.3	2.3	95.3
	7.73	1	.7	1.2	96.5
	7.85	1	.7	1.2	97.7
	8.00	2	1.3	2.3	100.0
	Total	86	57.0	100.0	
Missing	System	65	43.0		
	Total	151	100.0		

From Bullets to Ballots: Examining the Characteristics of Criminal Insurgency

JASON A. BAKAS

Abstract

This paper analyzes what characteristics are needed to qualify a group as a criminal insurgency. It presents the argument that criminal insurgencies are defined by their strategic political objectives to delegitimize the institutions of the constituted authority, and surreptitiously rule it through the placement and corruption of political figures. Ultimately the paper will demonstrate what characteristics indicate an organized crime group has crossed over to become and insurgency, or demonstrates a vector towards becoming an insurgency.

Keywords: criminal insurgency, organized crime, drug cartels, mafia

Introduction

A new wave of violence is plaguing Mexico, dominating the media, and triggering a series of travel advisories. Mexico has become one of the most violent countries on earth. At the end of 2017, Los Cabos was rated as the most dangerous city in the world with a murder rate of 111.33 per 100,000 people (World Atlas, 2017). Fueling the nation's murderous violence is a conflict between government forces and multiple drug trafficking cartels - which over the preceding years have amassed unprecedented levels of power. Starting in 2006, then Mexican President Felipe Calderon declared war on the drug cartels and began using military and police forces to actively target them within Mexico. The cartels responded by waging an unbelievably brutal war against government forces. To this day the violence continues, severely inhibiting the Mexican government's ability to provide basic security and social services to its citizens. Reports place 2018 as the most violent year on record for Mexico. The economic impact of violence at the end of 2017 reached US $249 billion, equivalent to 21 percent of the country's GDP; this is amongst the highest in the world (Mexico Peace Index, 2018). Because of this escalating violence and the rampant corruption throughout state institutions, many have lost faith in the Mexican government and want an end to the war on the cartels.

Newly elected President Andrés Manuel López Obrador, commonly referred to as AMLO, has promised peace and an end to more than a decade of the drug war—but in a radical new way. AMLO has been a long standing critic of former president Calderon's military approach to combating the cartels. The newly elected president promises to create political and economic reforms that combat the root of the security problem. "Abrazos, no balazos" —or "hugs, not gunfire"—has been a campaign slogan of his. Time will tell if AMLO's policy is the right direction for Mexico.

The strategy put forth by the AMLO administration is not novel; it has long been advocated by scholars who study Mexico's domestic instability. In 2011 Jose Merino, of the *Americas Quarterly,* adamantly argued that Mexico would not be able to win the war on drugs with its then current strategy—a strategy that has not dramatically changed in seven years. Merino (2011), claimed that in areas of Mexico where government forces undertook large operations against the cartels, homicide rates went up from 12.8 to 41.3 or from 15.9 to 34.5 per 100,000 residents (depending on which polling numbers are considered). Both cases show a massive jump in homicide rates, and Merino states that Mexicans are unable to stomach the death tolls, and do not see "kill counts" as a measure of success. Merino (2011) advocated that increasing the body counts of criminal elements in Mexico caused its citizen's to lose trust in the nation's judicial system. Merino (2011) further advocated for social policies promoting education, and employment opportunities for Mexicans–to prevent the impoverished population from working in the narco-industry.

While this paper's introduction has examined the social and economic costs, as well as, the impacts on internal security in Mexico; the paper's focus is not on Mexico. Mexico is used demonstratively, in order to understand the climate of a nation in the mist of civil strife with criminal insurgency groups. Groups like the cartels, are vastly different from traditional crime groups. They are not only interested in trying to profit within the state—but also intent to *rule* the state, through their use of *plata o plomo*[1] tactics. For

1 Translated as "bribes or bullets."

this reason, the actions of the cartels more closely resemble that of an armed insurgency, rather than a traditional organized crime group. It is evident that the lucrative nature of illegal drug trafficking has created these powerful hybrid criminal insurgency entities sometimes referred to as "Narco-Terrorism" (Wang, 2010). Combating an insurgency requires a unique approach. Then Chairman of the Joint Chiefs of Staff, Admiral Mike Mullen stated when discussing the U.S.'s global counter-terrorism operations, "We Can't Kill Our Way to Victory" (Thompson, 2011). There is no truer maxim for a nation battling a criminal insurgency.

Criminal insurgency, on the surface, can seem indistinguishable from traditional organized crime. This begs the question; *what exactly makes a criminal group, or groups qualify as a criminal-insurgency?* The keystone factor that most likely impacts the media's syncretism of the terms "criminal insurgency" or "narco-terrorism" is the radical violence used by these groups. While it is true that criminal insurgencies conduct paramilitary style attacks and engage in activities including kidnap and ransom, assassinations, and executions (Paoli, 1999; Ríos & Shrik, 2011), this in-and-of-itself is not sufficient to qualify a crime group as a criminal-insurgency. The characteristics that allow for the title of criminal-insurgent focus around a group's political orientation and strategic goals to delegitimize the state in which they operate.

Purpose

This paper will provide an analysis of the characteristics of political insurgency. The author will present defining motivating characteristics as well as strategic, tactical and operational characteristics. In doing so the paper will demonstrate how these facets—when conducted by an organized crime group—qualify that group as an insurgency. Ultimately the paper will demonstrate when an organized crime group crosses over to become and insurgency or demonstrates a vector towards becoming an insurgency. Understanding this distinction is important for law enforcement intelligence analysts new to national and international operations. Qualifying and understanding organized crime can be amorphous. As von Lampe (2002) states:

> "… the phrase "organized crime" was allowed to take on an existence of its own quite independent from the social reality it supposedly relates to. Social scientists, then, not only face the challenge of nailing a "conceptual pudding" to the wall. They also have to deal with the duality of organized crime as a facet of social reality and as a social construct. In the latter capacity its associative and luring power strongly influences public perceptions, policy making and law enforcement towards a warlike attitude" (p. 191).

Therefore it comes as no surprise that understanding criminal insurgency can be seen as equally challenging, due to the varied and amorphous definition of organized crime. For some, viewing criminal groups as a political entity may seem strange and ambiguous at first. One of the goals of this paper is to provide clarity, and aid in analysts in understanding the key concepts that distinguish criminal insurgency.

Ideological Characteristics and End State Goals

THE POLITICAL NATURE OF INSURGENCIES

It is a common misconception that today's insurgent conflicts, such as those conducted by the self-proclaimed Islamic State in Syria and Iraq, are a new advent in the history of warfare. However, far from defining modern war, insurgencies have occurred often throughout history. A defining characteristic of insurgencies has always been that they are political in nature and use a political orientation to present themselves as a superior alternative to the constituted authority (Taber & O'Neill, 2002). Mao Tse-tung was one of the first to explicitly describe the political orientation of an insurgent movement. For Mao, any insurrection without political objectives was meaningless and destined to fail (Mao, 1937). Further, Brazilian revolutionary Carlos Marighella wrote in his, *Mini-Manual of the Urban Guerilla* (1982), that the urban insurgent is a political revolutionary that follows political objectives. Moreover, Vietnamese General Vo Nguyen Giap agreed that his efforts against the French in Indo-China was primarily a political struggle where indoctrination of the people through the party administration directly led to battlefield success (Taber& O'Neill, 2002).

Some argue that history has been replete with anti-government groups that have caused considerable chaos for both the government and the local territory, without a political objective; this claim attempts to weaken the argument that insurgencies are defined as political (Burns, 1994; Thorup, 2008). It is critical to note, traditionally non-political anti-government forces where not classed as insurgence due to the important distinctions over legitimacy and the political *status quo*. An insurgent group's motivation and end state goal are establishing itself as a legitimate political alternative and gaining *de jure* political power (Burns, 1994; Schultz, 1978; Thorup, 2008). In other words, they aspire to overthrow the existing political structure and implement their own political system that functions under a new ideology. In stark contrast, violent non-political anti-government groups, classically referred to as *bandits*, did not seek to gain any degree of political legitimacy and only fought for material gain (Mackinlay, 2009). Bandits do not want to seek change in the political system. In fact, bandits enjoy the political *status quo* that allows them to gain material wealth (Cretin, 1997; Jamieson, 2000; Mackinlay, 2009).

It is probable that bandits were often confused with insurgent groups, due to their use of insurgent style tactics and high degree of violence. Typically, insurgents have contempt for bandits who seek to profit from, instead of change in, political systems. For example, Marighella (1982) stated that while bandits existed within Brazil, they only sought to use violence to profit from the system - whereas the urban insurgent was distinct in that it should only attack targets that had political ramifications such as capitalist enterprises and government institutions. Additionally, Mao routinely instructed his guerilla fighters to never involve themselves in banditry (Mao, 1937). During the Cuban Revolution, Fidel Castro made a point to publicly execute two bandits who had committed rape, to highlight to the Cuban people that he sought political change and that his insurgency was distinct from banditry, which would not be tolerated (Taber & O'Neill, 2002). It is evident that a fundamental characteristic of insurgencies throughout history has been their political motivation.

While banditry may be classified by some as criminal-insurgency, it ought to be distinguished from it. Groups such as Mexico's and Colombia's drug trafficking organizations, and others like them, have shown political objectives parallel to traditional political insurgencies. They not only wish to profit from within the political system but look to delegitimize the institutions of the constituted authority, and covertly rule it through the placement and corruption of political figures. In this way these crime groups can be classified as insurgencies—as they are politically driven. For example, Pablo Escobar, leader of the Medellín drug cartel, organized the 1989 mid-air bombing of Avianca Airlines Flight 203 in Columbia (Bowden, 2001). Escobar, ordered the bombing with the intent to kill Colombian presidential candidate César Gaviria Trujillo; who vowed if elected would declare war on the cartels (Bowden, 2001). The bombing killed all 107 people on board. This violent act, communicated a political message, and permeated psychological effects and fear on the general populace. Further, it can be argued that the act was motivated by a political agenda. Escobar needed a political figure in power that would allow him to continue to operate.

THE POLITICAL CRIMINAL NEXUS OF CRIMINAL INSURGENCIES

Criminal insurgencies attempt to delegitimize the political institutions of the constituted authority, through the corruption of political and government offices (Fijnaut, 1990; Finckenauer, 2005; Lyman & Potter, 2006). The goal of any organized crime group is to financially thrive by engaging in prohibited and lucrative activities. However, to do this with impunity they need the protection or sponsorship of politicians, government officials, and law enforcement (Finckenauer, 2005; Paoli, 1999). The connection between politicians and organized crime is best described as a "clientelistic" relationship—with organized crime receiving protection from political figures in exchange for support or profit (Pimentel, 2000). For example, the *Ndrangheta* are known to have infiltrated political offices across Italy. In 2012, the commissioner of Milan's regional government in charge of public housing, Domenico Zambetti, was arrested for corruption (Squires, 2012). Zambetti was accused of supporting the *Ndrangheta* in exchange for votes (Squires, 2012).

Once installed in the political system, organized crime becomes institutionalized. This gives criminals power and influence over political figures and begins the process of when crime groups start to move in the direction of becoming an insurgency. The criminal political nexus of organized crime influence has five critical effects on government: (1) It creates a monopoly of coercion; (2) it undermines the administration of justice; (3) it undermines administrative capacity; (4) it effects the provision of minimum public goods; and (5) it prevents legal conflict management (Bailey & Godson, 2000). In other words, once corrupted, the government or its institutions become a puppet of the organized crime groups. This threatens the authority of law; negates the monopoly on the use of force; and jeopardizes the competency and legitimacy of democratic institutions (Fijnaut, 1990; Finckenauer, 2005; Shelley, 1995). Moreover, once organized crime has penetrated the political authority, it effectively prevents the government from combating crimes linked to itself within the state (Shelley, 1995). For example, during the Maxi-Trials of the 1990's some *Cosa Nostra Mafiosi* avoided murder convictions by influencing judges through their political corruption (Paoli, 1999). Further, at the height of Mexico's internal drug wars, cartels were spending an estimated 500 million dollars in bribes to government officials. Bribes were so common that they were simply seen as a tax on the

narco-industry, and Mexican police officers were routinely paid to act as enforcers for the cartels (Andreas, 1998). Police chief positions were auctioned off by the government to the highest bidder. The individuals in these positions were given substantial bribes by the Mexican drug trafficking organizations to keep trafficking routes open (Andreas, 1998). States like Mexico exemplify the detrimental effects of the criminal political nexus. In these states the "connection between organized crime and politics is so tight that there is no longer any practical distinction between the two" (Moran, 2001, p. 385).

The parallels in political identity and motivation between criminal insurgency and traditional political insurgency are evident. One is a political entity with a political message who seeks to usurp the constituted authority; while the other seeks to delegitimize the constituted authority through corrupting the system in pursuit of material gains. Ultimately the goal of any insurgency is to gain power. The fact that power and politics are part of criminal insurgencies can make it difficult in distinguishing political violence from criminal violence.

MOBILIZATION OF THE POPULACE

A further characteristic of criminal insurgencies is that these groups seek to gain support or compliance from the local civilian population within their region (Albanese, 2001; CIA, 2009; Longmire & Longmire, 2008). This is a characteristic central to traditional political insurgency.

In his writings, Mao stated why popular support was so important for the insurgent. In his fight against Chiang Kai-Shek's national army, Mao was unable to build his own logistical network for his insurgents, because of the underground nature of insurgency (Nagl, 2002). By mobilising the population, Mao was able to inherit a network from the people as they provided him shelter, recruits, and supplies throughout his conflict with the nationalists (Little, 2008). Further, after Mao was able to politically indoctrinate the people, they became pseudo-insurgents themselves. They resisted government interactions and supplied intelligence and military support, becoming autonomous revolutionary units that government forces had to fight, dramatically increasing the insurgents' strength (Nagl, 2002). This often decided the outcome of an insurgency conflict and required insurgencies to develop their abilities at mobilising the people in order to effectively counter the government (CIA, 2009).

Parallels can be seen between this and criminal insurgencies. It stands to reason; that like a political insurgency, criminal insurgents rely on popular support from its regional inhabitants to flourish (Finckenauer, 2005; Paoli, 1999). The underground nature of criminal networks presents significant challenges in operations. The greater the support from the public, the less likely someone will contact the police, inform rivals about operations, or testify in court to illegal activity they witnessed.

To gain this vital popular support, political insurgents use several strategies to convince the people that it is in their best interest to support the insurgency. While insurgents were limited in what direct material they could provide the people, they would often lower rents and costs in their territories which they held in order to increased local support (Sekeris & Siqueira, 2012). For example, in the early years of the Cuban Revolution, Fidel Castro instituted a tax reform law that distributed land to peasants, implemented social services, and cut out corruption - gaining him substantial support from the people

of the Sierra Maestro Mountains (Taber & O'Neill, 2002). Marighella (1982) believed, providing material aid and increasing the well-being of the people would demonstrate to the population that the insurgents would be a better political ruler than the government.

This same strategy has been historically used by criminal insurgency groups and organized crime groups moving in the trajectory of insurgency. For example, The Great Depression allowed organized crime groups to increase their public image in the community in which they operated, through social programs. The Capone crime group would commonly feed the poor during the depression by establishing and funding Chicago soup kitchens (Albanese, 2010). The Gotti crime group routinely put on free fireworks shows during baseball games and other celebrations to raise public morale (Albanese, 2010). Moreover, Mexico's poor economy and massive unemployment resulted in a poverty rate averaging 45.2 percent from 2008 to 2016 (World Bank, 2018). With few legitimate jobs, Mexican drug trafficking organizations stepped in and supplied anywhere from 200,000 to 300,000 desperately needed jobs which inserted as much as 7 billion dollars into Mexico's economy (Ríos & Shrik, 2011).

While material aid may be important in gaining support, ideological and political indoctrination are paramount in mobilising the population. Political insurgent groups would create a political identity and ensure that the people were exposed to a constant stream of indoctrination (Mackinlay, 2009; Taber & O'Neill, 2002). By harnessing class, national identity, economic and cultural grievances, insurgents are able to integrate themselves in the communities that they sought support from (Burns, 1994). Indoctrination tactics using identity, economic, and cultural factors have also been used by criminal insurgency groups. Those that join crime groups sometimes come from lower-class, ethnically homogeneous and ethnically isolated neighbourhoods (Albanese, 2010). Under these conditions ethic groups suffer from in-group solidarity and a lack of pro-social integration from the greater mainstream culture (Bovenkerk, 2011; Brenneman, 2010). This manifests into negative attitudes towards the out-group. These attitudes often include fear, contempt, anger, or disgust towards the out-group (Arsovska & Craig, 2006). It may also manifest into feelings of perceived injustice do to institutional disadvantages (Wright, 2010). With political institutions seen as an agent of the mainstream culture, and thus as the out-group, it is easy for individuals in these poor ethnic neighbourhoods to distrust law enforcement. Further, members of these communities view criminality as legitimate because socially acceptable legitimate pathways to success are limited or not available and illegitimate pathways are ubiquitous within their lower-class subculture (Schmalleger & Vold, 2005). These illegitimate pathways replace the norms of the wider culture, "weakening …convention social bond[s] and strengthening the unconventional bond with delinquent peers" (Schmalleger &Vold, 2005, p. 229). These factors can all lead the community to support the criminal insurgency from a social ideological and identity perspective.

The support of the local population also plays a critical role in the spreading or transplantation of both criminal insurgencies, and political insurgencies. When Ernesto "Che" Guevara attempted to export the Cuban Revolution to Bolivia, he did so without the support of the people. The rebellion was quickly quelled and Guevara killed, even though Bolivia had a generally inept military (Merari, 1993). In contrast, the immigration of *Cosa Nostras Mafiosi* into the United States occurred with unprecedented success. At the time many *Mafiosi* were "astonished by the rosy prospects Prohibition offered. It was the 'golden

goose' [they] rhapsodized," (Raab, 2006, p. 24). Society's general disregard for Prohibition, and support for those that provided them with bootlegged alcohol, coupled with the large semi-isolated Italian diaspora communities, proved to be the fertile soil needed for Sicilian *Cosa Nostras* gangs to flourish in the United States. Regardless of whether material enticement, political indoctrination or both are used, attempting to mobilise the people in support of a group and its activities is a defining characteristic of criminal insurgency.

Tactical Characteristics

Violent acts committed by criminal insurgency groups often employ the same or similar tactics, techniques, and procedures as political insurgency groups (Longmire & Longmire, 2008). The asymmetrical nature of both groups dictate that guerrilla warfare style tactics are used as the principal method for instituting violence, thus making it one of the defining characteristics of criminal insurgency. These principles have been adopted and endorsed by virtually all successful political insurgent leaders, such as General Giap, who declared guerrilla warfare as "the way of fighting a revolution," (Taber & O'Neill, 2002, p.60); Carlos Marighella, (1982) who believed that urban insurgents must use guerrilla tactics in order to survive and attack the enemy; and Mao, who said guerrilla warfare was necessary in order to harass the enemy to exhaustion (Thorup, 2008 p. 346).

Criminal insurgency groups employ "hit-and-run" style attacks and conduct ambushes against political targets and law enforcement. These tactics fall under the parameters of guerrilla warfare, and allow criminal insurgent enforcers to remain highly mobile and avoid government counter-attacks or direct confrontations (Flanigan, 2012; Longmire & Longmire, 2008). Mexican drug trafficking organizations commonly engage in asymmetrical attacks with Mexican military and law enforcement that have been compared to FARC–EP rebels in Colombia and IRA attacks that took place in the UK (Longmire & Longmire, 2008). Russian organized crime groups are known to use "hit teams," comprised of former Special Forces soldiers to eliminate competitors, leaders of rival organized criminal groups, and government officials (Finckenauer &Voronin, 2001). This type of violence has also been used by Italian mafia groups in the killing of numerous politicians and judges (Paoli, 1999).

It can be seen how the use of guerrilla warfare principles are a characteristic of both criminal insurgency groups and political insurgencies. Moreover, the strategic use of these tactics holds parallels. Traditional political insurgents use guerrilla attacks in an effort to maintain a steady amount of government casualties, which reduces government forces' morale (Katzenbach & Hanrahan, 1955). Further, unlike the western paradigm of war - which seeks to end conflict as soon as possible, successful insurgent leaders desired to prolong the conflict (Katzenbach & Hanrahan, 1955; Taber & O'Neill, 2002). For insurgent fighters, continuing conflict ensured that governments became economically drained, militarily frustrated, and subsequently lose the will to continue fighting (Taber & O'Neill, 2002). This functions as a means to fulfill their desire to seize control of the state and take control as an alternative to the legitimate government.

Similarly, criminal insurgent groups use guerrilla tactics that allow the groups to be disproportionally effective, and force the government to become militarily frustrated, thus damaging morale. These tactics have proven successful leading to the deaths of over 3000 Mexican police and military forces (Rawlins, n.d.). Further, the continued attacks on

government forces often cause authorities to respond with a militarized and repressive approach to policing (UNODC, 2012). This harsh repression further damages governance through the erosion of civil rights and, pushes the population further into fear, as they distrust government police forces—which ultimately pushes the population deeper into the criminal insurgent's hold (UNODC, 2012).

Terror Tactics and the Control of Territory

Traditional political insurgents' use of terror tactics has often led to a confusion between insurgent groups and terrorist organizations. While definitions may vary, Merari (1993) asserts that terrorism differs from insurgency in an important aspect—terrorists do not control territory. In contrast, insurgencies seek to—and succeed in—controlling territory in order to operate their anti-government campaign free from the interference of government authorities (Byman, 2007). Moreover, insurgents will violently contest all government actions within the areas they control. This allows insurgents to maintain the benefits of controlling territory without the danger of being forced into conventional combat (Little, 2008; Taber & O'Neill, 2002). This is an important defining characteristic of insurgencies that distinguishes it from terrorist organizations. Similarly criminal insurgency groups use terror style violence in a strategic effort to seek control of territory (Finckenauer, 2005; Longmire & Longmire, 2008). However, holding territory is different in the context of criminal activity. Rather than take over political power in a geographical area for ideological reasons—criminal insurgency groups desire to gain control over economic activities, and gain exclusive control or influence over both legitimate and criminal markets of prohibited goods (Finckenauer, 2005). Further—as discussed—criminal insurgency groups look to gain power over government actions within their controlled areas, through the infiltration and corruption of political and law enforcement officials (Finckenauer, 2005; Paoli, 2001).

Terror Tactics as a Propaganda Tool

Propaganda is often only thought about in the context of broadcasts, internet media, pamphlets, and newspapers. However, the concept of propaganda can be melded into terror attacks, confrontations with government forces, or symbolic public acts; this is known as Propaganda of the Deed (POTD) (Byman, 2007). Any attacks against symbolic institutions or civilians would inevitably be witnessed by many and attract public attention, spreading the insurgents' message throughout the region (Byman, 2007; Longmire & Longmire, 2008). This widespread public witness to violent extreme events sows fear throughout the wider population.

During political insurgencies, people seek to find the political meanings behind such violence (Bolt, Betz & Azari, 2008). For example, The Irish Republican Brotherhood (IRB) used POTD by enacting a bombing campaign against the London underground train system from 1883-1887, that was meant to showcase the Irish struggle for independence through disrupting a widely used public service in the heart of London (Bolt, 2008). In the context of criminal insurgency, the trepidation of surprise violent attacks, functions as an intimidation tool creating social control through fear mongering (Longmire & Longmire, 2008). Mexican cartels and Italian crime groups would commonly engage in public shooting or the murder of public officials (Longmire & Longmire, 2008; Paoli, 1999). Further, cartel enforcers routinely use beheadings during executions, hang bodies,

or hang large banners in public with a message indicating their territory, or the reasons for the executions. This sends a message directed toward both the government and civilians, assuring them that the state does not hold a monopoly on the use of force (Longmire & Longmire, 2008).

In many ways, POTD is a powerful method to intimidate the government in an effort to gain control over the populace and to prevent, or deter one from providing information to government forces on the actions they witnessed. POTD is an effective strategic weapon for establishing a narrative of fear. It enabled criminal insurgent groups to spread their messages to a far larger portion of the population.

Conclusion

The U.S. military's Counter-Insurgency Field Manual describes an insurgency as "an organized, protracted politico-military struggle designed to weaken the control and legitimacy of an establish government… while increasing insurgent control… who use coercion or persuasion to gain support." (US Army, 2006, p. 1-8). A criminal group who demonstrates efforts to completely undermine government legitimacy to gain free reign for their operations and uses *plata o plomo* tactics to delegitimize the government—clearly distinguishes itself as an insurgent force.

While all crime groups are motivated in part by profit, and engage in prohibited and lucrative activities within the state. Only once a crime group establishes a political nexus to provide itself protection or sponsorship—which allows it to operate with impunity as a means to achieve its goals of profit—and that crime group uses force as a means to prevent its political hold from being removed—should that crime group be considered an insurgency. Looking at Mexico as an example, corruption was widespread throughout the nation, long before the 2006 war with the drug cartels. With so little action taken against the cartels by previous Mexican administrations, the cartels had no reason to provoke the government through violence. It was only after 2006 when the government not only directly attacked the cartels, but also started to stamp out the massive corruption in the government—did the cartels respond with extreme violence against government forces.

Like any nation struggling to combat criminal insurgencies, the future of Mexico is going to be determined by the success of suppressing the power and influence of the drug cartels. While the cost of Felipe Calderon's war on drugs is unfortunately high, not ending the cartels rule inflicts a much greater cost. For too many decades, the Mexican government has stood by and allowed the cartels free reign to institute its shadow rule over Mexico. Regardless of what strategy AMLO adopts, it will be vital to constantly monitor the level of violence occurring as a result of the war on the cartels. Achievement against the cartels will not only be measured in the strength and legitimacy of Mexico's government institutions, but also by the number of civilians that enjoy security from violence and persecution. Until this relationship is studied more methodically, arguments about the most effective way to combat criminal insurgencies will continue.

About the Author

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A Geospatial Analysis of Illicit Marijuana Cultivation Sites Across Colorado National Forests Using A Traditional Risk Terrain Modeling Methodology

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Abstract

Recent data provided by the US Forest Service indicate increases in Marijuana Cultivation Sites and plant seizures across Colorado national forests coincide with when marijuana was legalized in 2012. Numerous studies were examined to determine common environmental/ topographical and human/behavioral risk factors for predicting areas most suitable for marijuana cultivation across public lands. The present study utilizes traditional Risk Terrain Modeling to determine the most suitable MCS areas across Colorado national forests based on risk factors identified throughout the literature along with impromptu conversations with law enforcement officials with specialized experience in narcotics investigations and/or eradication operations. Data utilized in this study consisted of 51 cultivation sites between 2009 and 2016 across 11 Colorado Ranger Districts. Risk map results contradict the study's hypothesis that the riskiest areas did not more significantly overlap among districts having higher MCS and plant seizures, as was expected. Reasons as to why and recommendations are provided.

Keywords: Risk Terrain Modeling, outdoor marijuana cultivation, geospatial analysis

Introduction

In November of 2014, the Drug Enforcement Administration (DEA) published the *National Drug Threat Assessment* reporting a significant 37% decrease in marijuana plants seized from outdoor eradication operations between 2010 and 2011 from 9,866,766 to 6,228,953 and yet another 42% decrease between 2011 and 2012 to 3,631,683 plants. Such dramatic decreases had not been seen since the National Drug Intelligence Center (NDIC) published its 2005 threat assessment. According to the DEA (2014), such sharp declines could have in part been the result of a paradigm shift in national law enforcement strategy at prioritizing marijuana-related investigations in light of new state and local laws decriminalizing marijuana. Another reason mentioned was the successful interdiction in eradication operations across public lands, mostly national forests. It was believed these interventions forced cultivators to change their operational methods to transitioning to private lands, indoor grows, and/or moving to higher ground for the outdoor grows (DEA, 2014). Unfortunately, such a shift has made it more difficult for law enforcement to detect Marijuana Cultivation Sites (MCS) and conduct eradication operations on private lands and indoor grows where search warrants would be required.

A year later, the United States Attorney's Office District of Colorado published a press release highlighting the coordination of multiple federal, state, and local law enforcement agencies working together to confront the looming wave of illicit marijuana cultivation across public lands throughout Colorado. It reported that, between August and September, six illicit MCS in Colorado were identified and dismantled by law enforcement officers, three of which were in national forests (U.S. DOJ). Discovered among them were large amounts of marijuana plants totaling nearly 20,000 plants and over 500-pounds of dried marijuana. Overall, this press release revealed how the surge of illicit MCS were making their way to Colorado and operating outside of Colorado's marijuana regulatory system.

The 2016 *National Drug Threat Assessment* (DEA, 2016) echoed this concern of enforcement and prosecution difficulty for marijuana related offenses given the wide variability of marijuana approved laws by State. Despite that marijuana remains illegal under federal law, as of June 2016, the assessment reports 20 States and Washington DC have decriminalized marijuana, 25 have approved its use for medicinal purposes only, and four states (e.g., Washington, Oregon, Alaska, and Colorado) and Washington DC have approved its recreational use and retail in addition to its medicinal use. As such, Drug Trafficking Organizations (DTOs) have established themselves in states, particularly Colorado, where approved marijuana markets exist for the purpose of cultivating and distributing it illegally to other markets across the nation where it is still illegal (DEA, 2016). Taken together, the DEA warned that domestic marijuana cultivation and trafficking would remain high in the future and likely increase as more states adopt relaxed marijuana laws given that DTOs will continue to exploit these variable state legalities.

The purpose of this study was to utilize traditional Risk Terrain Modeling (RTM) as a GIS and statistical method for determining suitable MCS areas across national forests in Colorado. The overall hypothesis is that areas within Colorado Ranger Districts (RDs) determined to be at risk for the cultivation of marijuana will geographically overlap more significantly with districts where higher MCS counts and plant seizures were discovered between 2009 and 2016 and vice versa for districts with lower MCS activity. Ultimately, the goal is to provide the United States Forest Service (USFS) with a risk map that shows

areas of MCS suitability across Colorado districts based on the combination of environmental/topographical and human/behavioral risk factors identified throughout the literature as being predictive of known MCS locations.

REVIEW OF THE LITERATURE

Airborne surveillance and detection have been some of the most common eradication tactics of MCS on public lands used by North American law enforcement for some time (Fung, 1993; Howell, 2002; Parent, 2008; Kalacska & Bouchard, 2011; DEA, 2014). It has involved flying an aircraft over designated areas of a national forest or state park above the tree canopy in search of MCS and when discovered, relay GPS location information to ground troops to eradicate the plants found and dismantle the grow operation. While utilized extensively, spotter surveys cannot possibly locate every MCS given the thick forest covering the majority of the area, and the mountainous terrain. Also, in some cases, growers even go to considerable efforts to disguise the MCS by choosing locations in small clearings, camouflaging the plants among other vegetation, and/or planting crops in narrow strips along meandering streams or rivers. Airborne surveillance is very expensive, time consuming given the vast amount of terrain to cover, and most of all past research suggests that such strategy is only effective in detecting 25% of MCS over approximately a 40,000-square kilometer study area (Kalacska & Bouchard, 2011). Remote sensing analyses, on the other hand, have been found to locate three additional MCS for every one identified by trained spotters. That said, Kalacska and Bouchard (2011) also showed how hyperspectral imagery missed a certain number of smaller sites of less than 40 plants that were indeed detected by spotters. Nevertheless, the results of their study demonstrated that traditional aerial detection/spotter survey methods for identifying MCS across forests or state parks were vastly inferior to more advanced remote sensing/GIS hyperspectral technology. These findings make sense given the complications surrounding identification of MCS across dense mountainous terrain, growers' concerted efforts to hide sites, and the overall logistics of visually surveying an expansive area from moving aircraft.

Alternative approaches to the identification of MCS that have been inexpensive, relatively straightforward, and would likely enhance aerial detection/spotter survey eradication operations have involved the use of GIS and statistical methodologies to predict areas where potential MCS exist based on a combination of environmental/topographical, human/behavioral, and economical factors from previously known sites. In fact, numerous studies have long illustrated the effectiveness of these factors in predicting areas across public lands suitable for MCS (Fung, 1993; Howell, 2002; Parent, 2008; Partelow, 2008; Kalacska & Bouchard, 2011; Bouchard, Beauregard, & Kalacska, 2013; Medel & Lu, 2015; Koch, Prestemon, Donovan, Hinkley, & Chase, 2016).

First among them was Fung (1993) who conducted an overlay analysis of vector (i.e., roads, water sources, land cover, & population) and raster[1](i.e., elevation, slope, & aspect) data to create a composite layer of all features combined and subsequently compare the predicted MCS areas with known locations. Overall, he was able to demonstrate that his spatial analysis correctly identified 80% of the 90 MCS locations discovered between 1991 and 1992.

1 In its simplest form, a raster consists of a matrix of cells (or pixels) organized into rows and columns (or a grid) where each cell contains a value representing information, such as temperature. Rasters can also be digital aerial photographs, imagery from satellites, digital pictures, or even scanned maps.

A decade to 15 years later, researchers from the Canadian Police Research Centre conducted studies to examine whether GIS analyses and methodology could estimate potential MCS areas across southeastern/southwestern Canada and then compare these predictions with verified MCS locations (Howell, 2002; Parent, 2008). While both studies varied significantly in their methodology such that Howell (2002) supplemented overlay analyses with remotely sensed satellite imagery whereas Parent (2008) created a weighted suitability index based on the frequencies of relevant factors (e.g., land use, water source proximities, sunshine hours, elevation, slope, aspect, & road proximity) collected from 450 confirmed locations, both discovered fruitful results in identifying potential MCS.

Comparable to Parent's (2008) findings, Partelow (2008) discovered a predictive MCS hit rate of 88-92% from use of GIS and statistical models aimed at discriminating actual MCS (N=96) from non-MCS (N=80) across California's Yosemite and Sequoia/Kings Canyon national parks based on similar environmental/topographical and human/behavioral factors as Parent (2008). In fact, both studies employed analogous methodologies such as transforming each factor to a raster, combining them to create a composite layer, and then reclassifying the single raster into specific groupings – weighted (Parent, 2008) versus binary (Partelow, 2008) suitable/risky MCS areas.

On the opposite end of the North American continent a study was conducted by researchers out of Texas State University (Medel & Lu, 2015) where environmental/topographical and human/behavior factors were examined to determine the impact of outdoor marijuana cultivation throughout Mexico. Of the 2,456 municipalities in Mexico, only 22% had reported having eradicated marijuana crops. Environmental/topographical variables such as minimum/maximum temperature and precipitation, and elevation were reduced to raster layers and human/behavior data (e.g., road proximity, population and police densities, forest land cover, & drug related killings) were weighted by each municipality's geographical size and population. Exploratory regression results revealed higher precipitation and slope were always associated with where eradication activity was less present, which supports previously cited studies in that MCS tend to be in areas with minimal rainfall, drier atmosphere, and on flatter terrain (Medel & Lu, 2015). On the flip side, higher drug related killings, police presence, forest land cover, suitable daytime temperature range (57-81° F), and road density were almost always associated with where eradication activity was more present. Thus, in Mexico, MCS tended to be surrounded by forest, within certain temperatures, close to a well-connected road network, and where drug killings and police cluster. Concerning the latter two variables, Medel and Lu (2015) offered gang/cartel-related activities and drug killings often occurred in areas where MCS were located which lead to an increase in police presence. Lastly, population density was associated with increased eradication activity in about 64% of sites discovered, which may suggest that in some cases growers seek out populated towns/cities in search of a pool of laborers who are likely of low income and desperate for work.

Recently, researchers (Bouchard et al., 2013; Koch et al., 2016) have attempted to understand the mindsets of outdoor marijuana cultivators using rational choice/decision making processes for explaining why certain sites are more suitable for outdoor cultivation than others. Although their analyses and methodologies were vastly different, their theoretical framework was conceptually identical in terms of a cost-benefit analysis that outdoor marijuana cultivators confront. For instance, Bouchard et al. (2013) utilized Journey to Crime literature to understand the selection and adaption of a suitable MCS based on the

following criteria: proximity to the nearest road, physical accessibility to the site, and the simplicity of setting up a potential site. It was believed that ideal terrain for growers was close to a road but not too close to risk detection by law enforcement and/or passersby, overall physical accessibility based on the ruggedness and elevation, and lastly the simplicity of setting up a site due to the feasibility and costs of routing water via a makeshift irrigation system. Considering these factors that growers face when determining a suitable MCS, Bouchard et al. (2013) utilized the shortest distances to roads and water sources, and elevation measurements from each of the known 131 MCS to examine their association with the total number of plants discovered at each site across southwestern Canada. Their results indicated that among 75% of known MCS growers traveled 174-meters or less from the closest road, 531-meters or less from a nearby water source, and selected sites at an elevation of 352-meters or less. However, when all variables were combined to identify spatial patterns across all 131 MCS via a two-step cluster analysis, Bouchard et al. (2013) discovered the sites were not evenly distributed in that they clustered in four different ways, although, the two most prominent were labeled prime and rugged. Representing 47% of the 131 known MCS, the prime cluster seemed to combine the best of all three distance measures given that on average these sites were close to a road (118-meters), close to water (215-meters), and located on relatively flat terrain (123-meters) whereas the rugged cluster was comparable to the characteristics of prime but on higher sloped ground and accounted for 28% of the 131 MCS.

Koch et al. (2016) on the other hand, took an economical approach where regional marijuana price variations, unemployment, poverty, and low retail wage rates were factored into the rational choice theoretical framework for explaining the dilemmas that outdoor marijuana cultivators' face. Their study involved 2,322 MCS discovered between 2004 and 2012 across national forests primarily in California, but also in Oregon and Washington. Data for 20 explanatory environmental/topographical and human/behavior variables were obtained and included in the development of their four binary models to estimate the likelihood that a given grid cell location would or would not be an MCS. Similar to the findings of previously reported studies, overall Koch et al. (2016) discovered the variables that were highly significant in discriminating locations where MCS were likely present involved aspect, slope in percentages, distance to the nearest water feature in meters, elevation, averaged precipitation in July, averaged maximum temperature in July, and county level unemployment and poverty rates. The results of their analyses demonstrated the most suitable areas for MCS across national forests were south-facing aspects, flat nor steep slopes, proximity to rivers or other fresh water sources, lower mid-summer precipitation, and lower elevation. Interestingly, higher unemployment rates were inversely related to growers' decisions to set up an MCS, and higher poverty rates were associated with increases in nearby MCS locations.

Taken together, from a geographical perspective, these findings across the multiple studies cited above make sense in that lower in elevation south facing slopes provide a more conducive grow environment due to greater sun availability, higher temperatures, and water from nearby streams or rivers can be more easily transported on sloped terrain that is not too flat or steep. Economically speaking, marijuana manufacturers' need customers who have jobs and money to purchase their product while at the same time their customers tend to be people who do not have much money to begin with, and not likely to report or cooperate with law enforcement.

Data Collection

In August of 2017, a Freedom of Information Act (FOIA) request was submitted by the author to the USFS Rocky Mountain Region Law Enforcement and Investigations Division (RM- LEID) requesting MCS data and total plant seizures across Colorado national forests over the past ten years. These data received from the USFS RM-LEID were provided in spreadsheet format, reported at the ranger district level, and served as the outcome variable in this study. The predictor variables were collected from a multitude of disparate sources and served as the MCS risk factors in this study. The following reveal from where these risk factors were collected:

- Forest Service roads and trails data were obtained and extracted via the Data Extract Tool from the USFS website (USDOA-FS).
- All hydrological data obtained and utilized in this study were downloaded from the United States Geological Survey's (USGS) website (U.S. DOI-GS) where the National Hydrography Dataset (NAD) is made available as a collection of point (i.e., NHDPoint), polyline (i.e., NHDFlowline), and polygon (i.e., NHDWaterbody) shapefiles.
- Both the maximum temperature and precipitation raster data obtained and utilized in this study were extracted from Oregon State University's Northwest Alliance for Computational Science and Engineering website (OSU-NACSE) via the "30-year Normals" link. These datasets describe average monthly conditions in temperature and precipitation over the past three full decades (i.e., 1981-2010) across the entire United States. Both datasets are specified at a 4-kilometer grid cell resolution and only the months from June to September were extracted to reflect the grow and harvest seasons.
- The Digital Elevation Model (DEM) raster data obtained and utilized in this study were extracted from the USGS's ColoradoView website (U.S. DOI-GS) under the Aerial Imagery tab and from the Colorado Aerial Remote Sensing section. These elevation data are specified at 10-meter resolution and provide continuous coverage across the entire State of Colorado.
- Both slope and aspect values across all of Colorado were computed using the DEM raster data via the ArcGIS Slope and Aspect geo-processing tools.
- The land cover raster data obtained and utilized in this study were extracted from USGS's Multi-Resolution Land Characteristics Consortium website (U.S. DOI-GS) via the "NLCD 2011 Land Cover" link. Initially created in 2001, the NLCD is Landsat-based specified at a 30-meter resolution of land use and cover across the entire United States.
- Colorado city data obtained and utilized in this study were extracted from the Colorado Department of Public Health and the Environment's (CO-DPHE) open data catalog website. This city data is a point shapefile consisting of 587 municipalities across Colorado.
- A spreadsheet consisting of population totals by Colorado municipalities between 2010 and 2016 was downloaded from the Colorado State Demography Office website (CO-DOLA) and joined with the city point data from the ColoradoView website via the PlaceFIPS field to provide more up-to-date municipality population estimates.

- Lastly, impromptu conversations were held with law enforcement officials regarding their experiences in identifying MCS across national forests in Colorado and participating in eradication operations. Such information was utilized to provide a real-world perspective on the MCS risk factors identified throughout the literature.

What is Risk Terrain Modeling?

According to its developers, the "Risk" in RTM refers to the probability of an occurrence of an undesired outcome, in this case an MCS, determined by the increased spatial vulnerability at certain places such as in parts of a national forest close to a road or water source (Caplan & Kennedy, 2016). "Terrain" refers to the attributes of a study area where equally sized grid cells consisting of spatial vulnerabilities are quantified at each place or within each cell. "Modeling" refers to the presence, absence, influence or intensity of the spatial vulnerabilities within real world places where their simultaneous effects can be measured as risk of the undesired outcome. In other words, RTM is essentially a diagnostic method for assessing spatial risk where attractors of criminal behavior are utilized to produce geographical forecasts of when and where crime will occur in the future (Caplan, Kennedy, & Miller, 2011; Caplan & Kennedy, 2016).

Unlike hotspotting or hotspots methods, RTM goes a step further and answers the why in addition to the when and where of criminal activity. Unfortunately, because modern RTM methodology requires the outcome data to be at the point level such as address or latitude/longitude (Caplan et al., 2011; Caplan & Kennedy, 2016), a traditional RTM approach was employed in this study due to the fact that the data provided by the USFS was at the polygon level in that MCS counts and total plant seizures were reported by districts as opposed to specific location data.

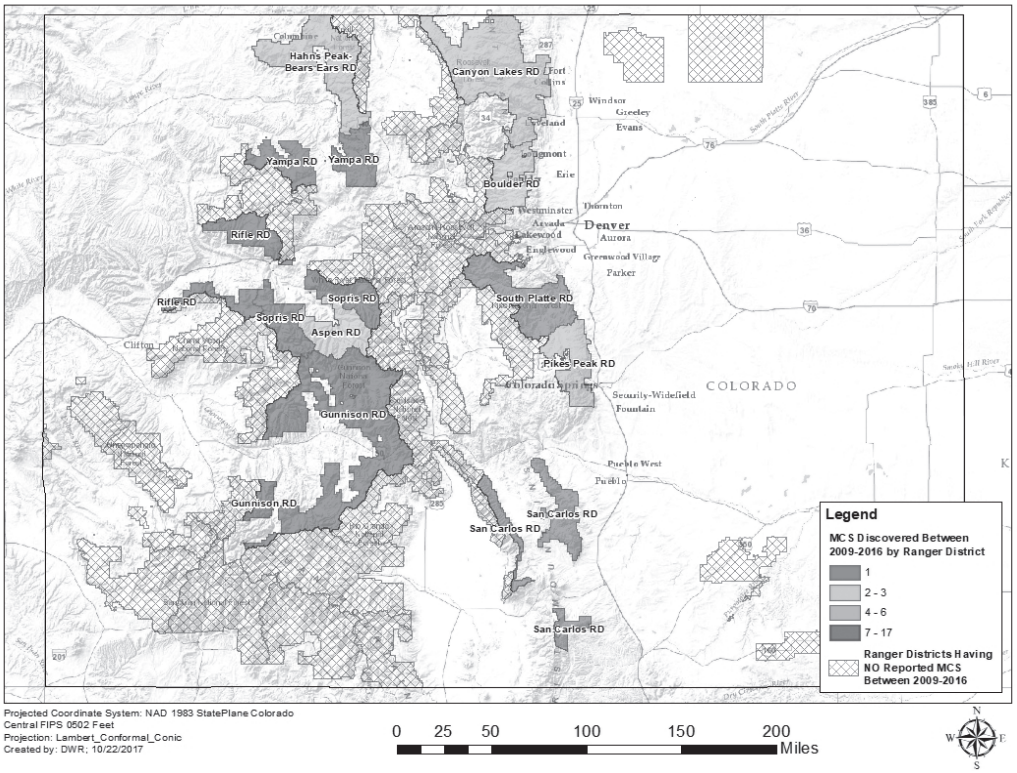
Study Results

Of the 38 USFS RDs in Colorado, only 11 reportedly had MCS discovered among them between 2009 and 2016 and subsequently had plants eradicated. While the 38 RDs encompass an area of 26,883 square-miles in Colorado, only 32% have had MCS discovered. The RDs with the highest MCS counts between 2009 and 2016 were the South Platte and San Carlos RDs, which span from southwestern Denver-metro to southwestern Pueblo, Colorado. Interestingly, both make up over half (55%) of the total 51 discovered MCS and 70% of the total plants eradicated between 2009 and 2016; yet, both only comprise 16% of the total area in square-miles.

Next were the Boulder and Aspen RDs which ranged from four to six MCS discovered during the same period. Further examination reveals that while the Pikes Peak RD has seen smaller numbers of discovered MCS in the past (2-3), it has the second highest range (13,855-26,200) for total plants eradicated whereas the Boulder RD has had more MCS discovered (4-6) yet a smaller amount of plants eradicated (6,566-13,854). Overall, it appears that a lesser number of discovered MCS and plants eradicated were among those RDs at higher elevation ranging from the southwest to the northwest.

Figure 1

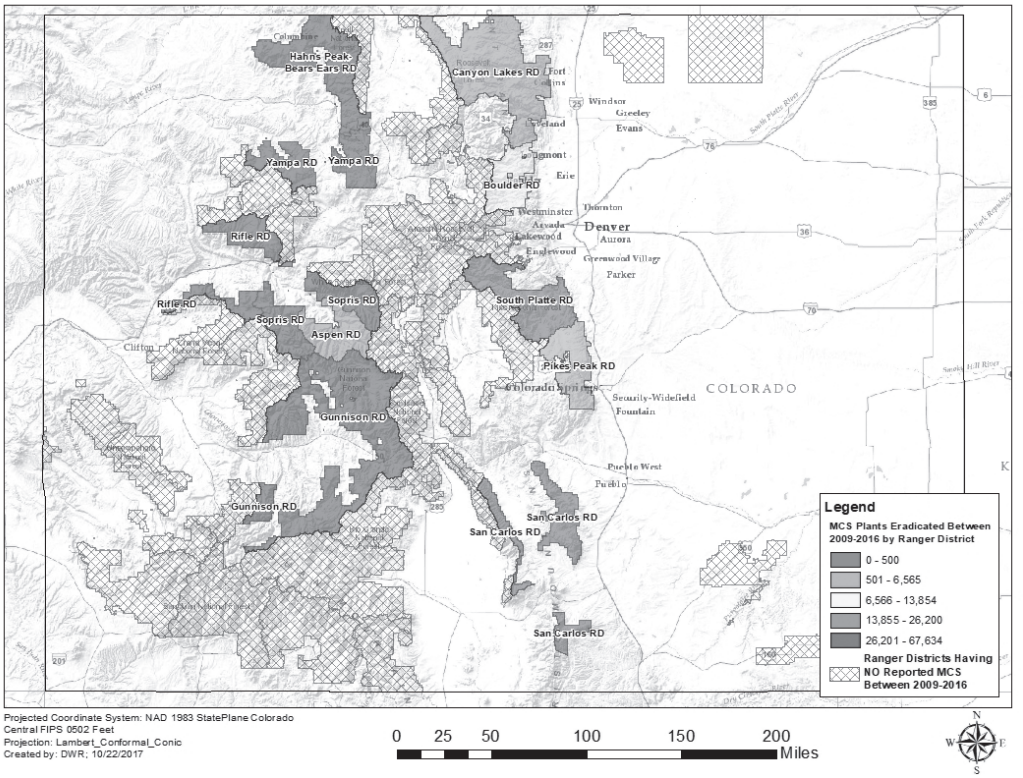
Total Marijuana Cultivation Sites Discovered Between 2009 and 2016 within Colorado National Forest Ranger Districts



Source: USFS RM Region Law Enforcement & Investigation Division; USFS Data Extract Tool website

Figure 2

Total Marijuana Plants Eradicated Between 2009 and 2016 within Colorado National Forest Ranger Districts

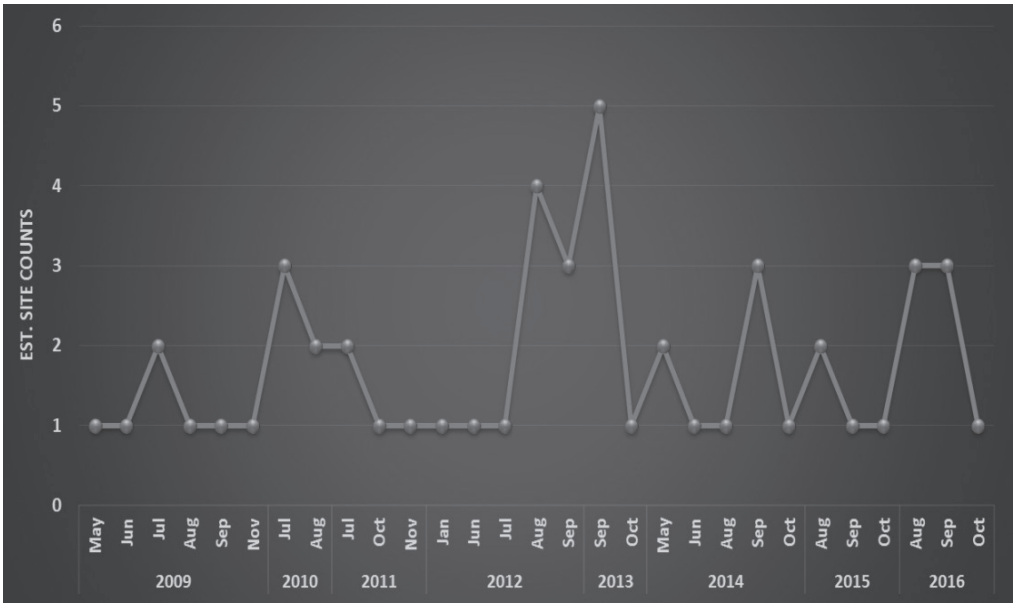


Source: USFS RM Region Law Enforcement & Investigation Division; USFS Data Extract Tool website

Figures 3 and 4 below show the trends by month and year of the estimated counts of MCS and estimated totals of plant seizures across Colorado national forests since 2009. Clearly, the increases in site counts and plant seizures across Colorado national forests seem to coincide with the 2012 timeframe when marijuana in Colorado was legalized. Also, recent trends illustrate how over the past few years the MCS counts and plant seizures have been on the rise across Colorado's national forests.

Figure 3

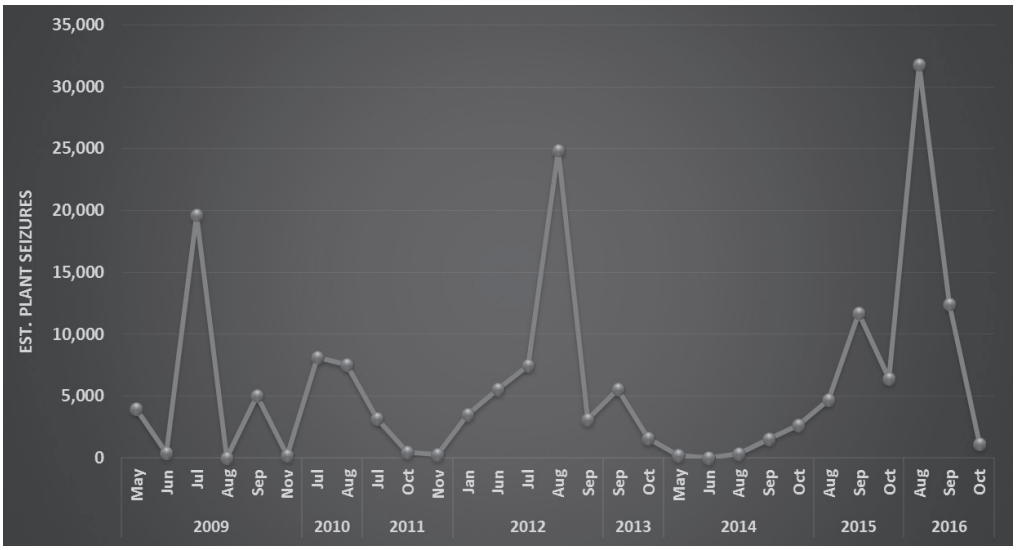
Estimated MCS Counts across National Forests in Colorado by Month & Year



Source: USFS RM Region Law Enforcement & Investigation Division

Figure 4

Estimated Plant Seizures across National Forests in Colorado by Month & Year



Source: USFS RM Region Law Enforcement & Investigation Division

ENVIRONMENTAL RISK FACTORS

Five individual variables made up the environmental risk factor grouping: Forest Service roads and trails, hydrology features (i.e., creeks, rivers, reservoirs, & lakes), maximum temperature, and maximum precipitation. The first three variables were vector data types (i.e., polyline & polygon) and as such the same geoprocessing tasks were executed to provide

preliminary analysis of the data. Also, the latter two variables were raster data types and different geoprocessing tasks were run to provide a similar summary as the vector data. Appendix Figure 1 illustrates and details the specific geoprocessing tasks executed in the data preparation process.

Of the 9,286 USFS road features extracted and dissolved among all 38 Colorado RDs, 40% (3,721) fell within districts that had a history of MCS being discovered. Pertaining to the 2,512 USFS trail features across all Colorado RDs, 840 were within those RDs where MCS were previously discovered. The RDs that had reported higher MCS counts and plant seizures (South Platte, San Carlos, etc.) appeared to have a smaller network of roads and trails and vice versa among most of the western RDs except for the Aspen RD. The only other exception to this trend is the Boulder RD where moderately higher MCS activity has been reported yet has a highly integrated network of roads and trails.

Pertinent to this study are the NHDFlowline polyline data which correspond to river and stream features nationwide and the NHDWaterbody polygon data pertaining to lakes and reservoirs. The overall the averages for each water source across the 11 MCS RDs were 2.8 for rivers, 84.5 for creeks, has 31.2 lakes, and 10.5 reservoirs. Hydrological findings reveal MCS counts between 2009 and 2016 reveal that the San Carlos RD appears to have the second highest MCS counts as well as the highest river counts and the second highest creek counts. Interestingly, however, the South Platte RD, which has the highest number of MCS counts seems to have across the board the smallest number of water source features than the other RDs. The same trend is true of the Aspen and Boulder RDs whereas the RDs to the west have much higher counts of water sources yet considerably smaller MCS counts and plant seizures between 2009 and 2016.

In terms of temperature differences across the 11 MCS RDs, as expected, those between the southeast and northeast are generally warmer by 10 to 15 degrees Fahrenheit which is reasonable given that they are also at lower elevation. Nonetheless, the overall temperatures during the June and September months across all 11 MCS RDs would be considered generally comfortable weather ranging from 47 to 77 degrees. Precipitation values across the 11 MCS RDs overall vary similarly to maximum temperature values during the same period from 47 to 77 inches. As expected, those mid and northwestern RDs that are generally cooler in temperature have much higher levels of precipitation. Interestingly, the two highest RDs in MCS counts and plant seizures (i.e., San Carlos & South Platte) have very similar temperature values yet significantly different precipitation values. Overall, it appears the South Platte RD is slightly warmer yet much less moist and drier than the San Carlos RD.

TOPOGRAPHICAL RISK FACTORS

Four variables consisted of the topographical risk factor grouping: elevation, slope, aspect, and forest cover. All were raster data types and geoprocessing tasks were run to provide summaries by MCS RDs. Appendix Figure 2 illustrates and details the specific geoprocessing tasks executed in the data preparation process. Overall, eastern and especially the northeastern RDs are on average of lower elevation (approx. 2,700 meters) and those to the midwest are at much higher elevation (approx. 3,100 meters). It is interesting to note that the San Carlos, which has the second highest MCS count, appears to be overall 200 meters higher in elevation than the South Platte RD with the highest MCS count.

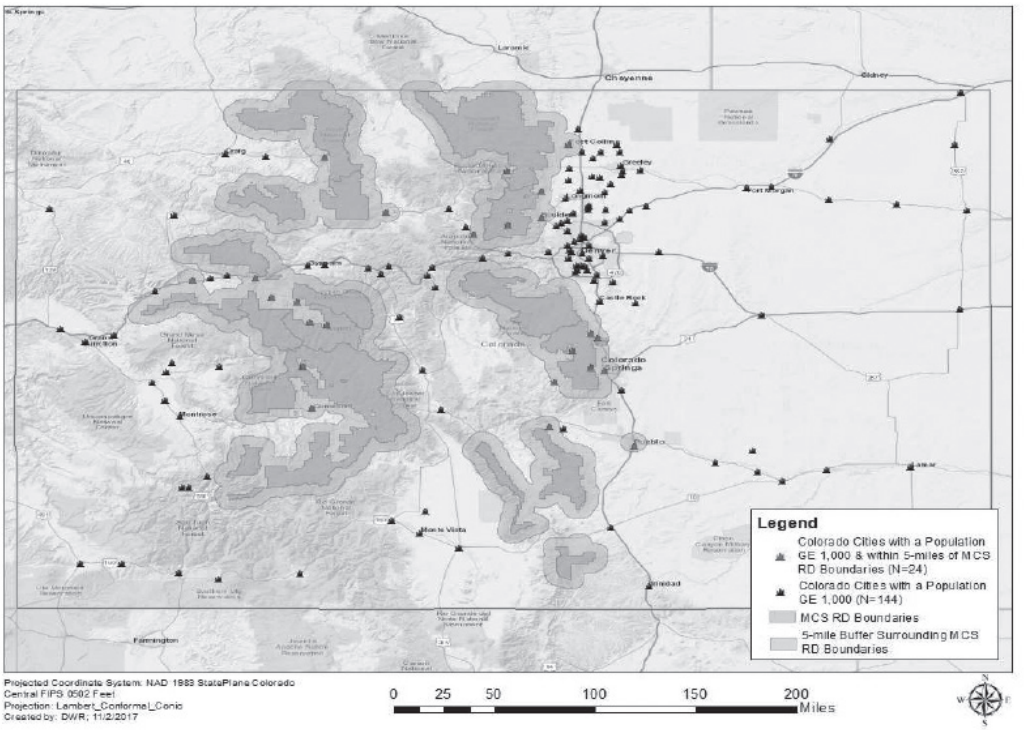
The slope and aspect values across the MCS RDs ranged between 13.6 and 23.1 degrees. Similar to the elevation contrast, the slope for the San Carlos RD is a few degrees higher than that of the South Platte district. Lastly, seventy-one percent of the land cover among the MCS RDs are made up of evergreen, deciduous, and mixed forestry followed by 14% grassland, and 8% shrubs/scrubs.

HUMAN/BEHAVIORAL VARIABLES

Two individual variables made up the human/behavioral risk factor grouping: Colorado cities and population. Figure 5 shows the 144 Colorado cities with an averaged population of 1,000 or more residents labeled with black icons and of those 24 in red were found to be within 5-miles of MCS RD boundaries. Appendix Figure 3 illustrates and details the specific geoprocessing tasks executed in the data preparation process.

Figure 5

Colorado Cities with a Population of 1,000 Residents or more and a 5-mile Buffer of MCS RD Boundaries



PROCEDURE TOWARD DEVELOPMENT OF A RISK TERRAIN MODEL

Risk factor distance and value range determination

The determination of which risk factors to collect and distances to specify for each factor was primarily based on the findings reported throughout the review of the literature across multiple studies. As a supplement to the review of the literature in the determination of risk factors and value ranges were impromptu conversations with Colorado Law Enforcement Officials (LEOs). Such officers consisted of Local Drug Task Force Officers, Drug Task Force & HIDTA Intelligence Analysts, and Colorado National Guard assigned to

Counter Drug. All LEOs spoken to had previous experiences in outdoor MCS investigations throughout Colorado. Table 1 provides a summary of this study's risk factors and their distances/ value ranges specified for RTM development. Also, Appendix Figure 4 reveals the variable reclassification geoprocessing tasks executed to specify the RTM model.

Table 1

Summary of Present Study Risk Factors, Descriptions, & Reclassified Distance and Value Ranges for Risk Terrain Model Specification

Study Variables	Variable Descriptions	Scale/Reporting level	Data Sources	Reclassified Distance/ Value Ranges
Outcomes				
MCS Counts	Discovered MCS counts	By CO Ranger Districts	USFS RM Region Law Enforcement & Investigations Division; USFS Data Extract Tool website	NA
Plant Seizures	Plant seizure totals	By CO Ranger Districts	USFS RM Region Law Enforcement & Investigations Division; USFS Data Extract Tool website	NA
Risk Factors				
Distance to nearest forest service road	Road polyline features	By CO Ranger Districts	USFS Data Extract Tool website	≤ 1,600 meters
Distance to nearest forest service trail	Trail polyline features	By CO Ranger Districts	USFS Data Extract Tool website	≤ 1,600 meters
Distance to nearest river	River polyline features (NHDFlowline)	Nationwide	USGS National Hydrography Dataset (NHD)	≤ 800 meters
Distance to nearest creek	Creek polyline features (NHDFlowline)	Nationwide	USGS NHD	≤ 800 meters
Distance to nearest lake & reservoir	Lake & reservoir polygon features (NHDWaterbody)	Nationwide	USGS NHD	≤ 800 meters
Elevation	Values from digital elevation model (DEM)	By State; 10-meter (raster data)	USGS ColoradoView DEM	≤ 2,400 meters
Slope (degrees)	Values generated from DEM	By State; 10-meter (raster data)	Derived from DEM	0-15 degrees
Aspect (degrees)	Values generated from DEM	By State; 10-meter (raster data)	Derived from DEM	135-225 degrees (southerly facings)
Land Cover	Land Cover - Deciduous, Evergreen, & Mixed Forest, Grassland/Herbaceous Shrub/Scrub	Nationwide; 30-meter (raster data)	USGS MRLC National Land Cover Database (NLCD)	Forest (41-43) Grassland (71), & Shrubbery (52)
Averaged Maximum Temperature Jun-Sep	30-year climatological average (1981-2010)	Nationwide; 4-kilometer (raster data)	OSU NACSE PRISM Climate Data	14-27 degrees Celsius
Averaged Precipitation Jun-Sep	30-year climatological average (1981-2010)	Nationwide; 4-kilometer (raster data)	OSU NACSE PRISM Climate Data	44-55 inches
Towns/Cities & Population	Towns/cities with population of 1,000 or more residents w/in 5-miles of MCS RD boundaries	By State	USGS ColoradoView DEM & CO-DOLA State Demography Office	24 CO Towns/Cities ≤ 8,050 meters (approx. 5-miles)

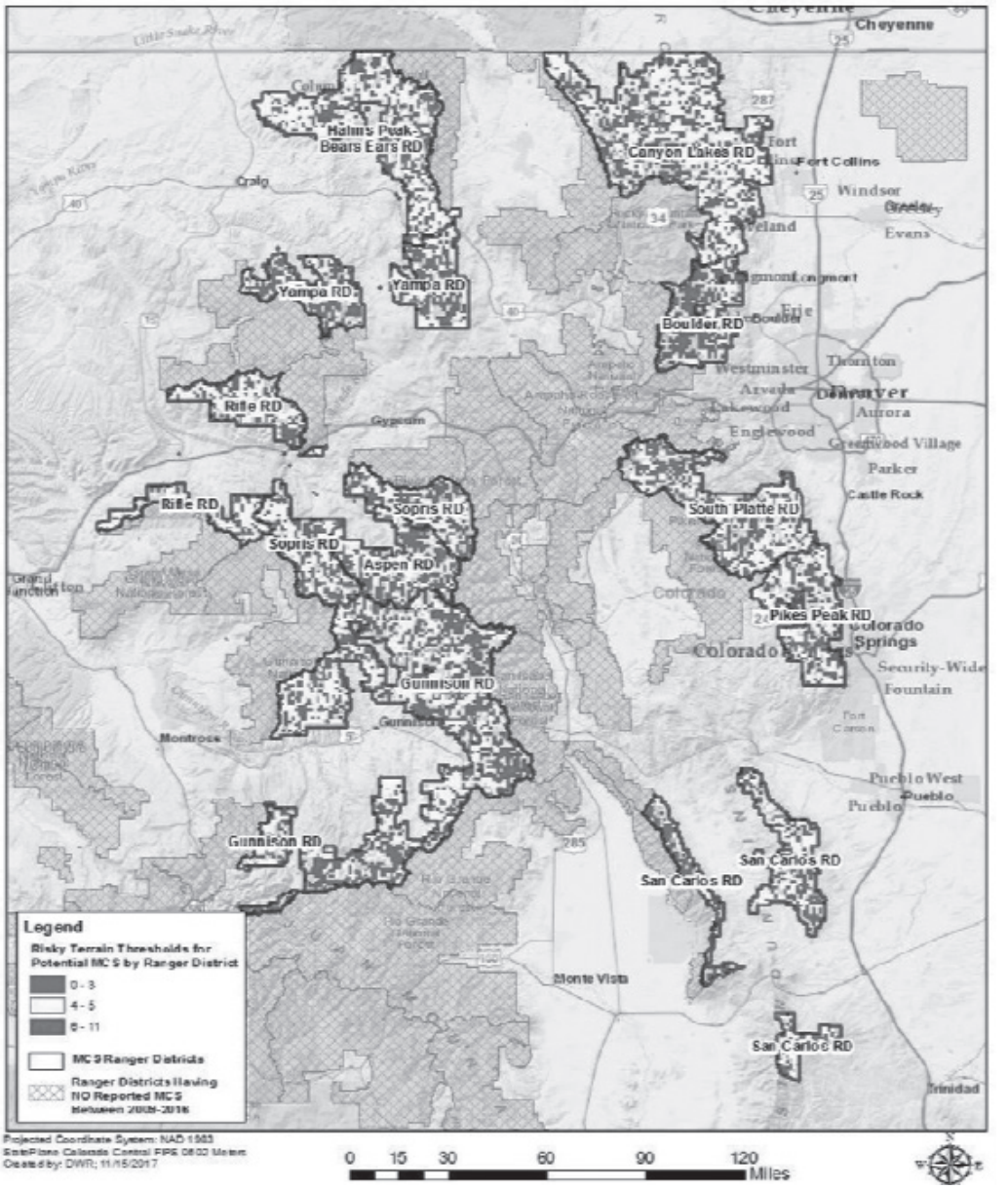
EXPLORATION OF FINDINGS & RISK TERRAIN MODEL EFFICACY

Risk map & known MCS map comparisons

The resulting combined risk factor raster layer consists of 250 columns by 343 rows made up of 12,104 individual grid cells approximately 1,600 meters wide (i.e., west to east) by 1,600 meters tall (i.e., north to south). Figure 6 below illustrates the risky terrain raster layer symbolized using three classes and the natural breaks (Jenks) classification scheme based on threshold values ranging from 0-3 indicating no to very low risk to 6-11 meaning very high risk for the potential of the area becoming an MCS. Specifically, the areas shaded in blue among all 11 MCS RDs indicate that between zero and three risk factors converge making them much less suitable for the cultivation of marijuana based on the model specifications previously set forth. On the other side of the spectrum, the areas shaded in red indicate that between six and up to 11 risk factors intersect thus making such areas the most suitable for marijuana cultivation across the 11 MCS RDs. Of the total 12,104 grid cells, only 28% or 3,378 consist of 1,600 x 1,600- meter cells that are at highest risk for the cultivation of marijuana across the MCS RDs. Moreover, of the 3,378 grid cells shaded in red at highest risk for becoming MCS areas, 2,351 (70%) consist of areas where six risk factors intersect followed by 855 or 25% of cells where seven risk factors converge, 160 cells (5%) where eight come together, and only 12 areas where nine or more risk factors intersect thus making these 12 areas the riskiest terrain for becoming a MCS.

Figure 6

Risky Terrain for Potential MCS by Colorado National Forest RDs Based on the Culmination of 12 Risk Factors



Visual inspection of the above risk map shows that the concentration of the riskiest cells shaded in red appear to be minimal among the RDs (i.e., South Platte, San Carlos, & Aspen) where MCS activity has reportedly been highest between 2009 and 2016. In fact, among the RDs with the highest MCS activity in the past only the Boulder RD has a significant amount of risky terrain cluster depicted in red. Ironically, the South Platte, San Carlos, and Aspen RDs all appear to have a rather large concentration of no to low risky terrain shaded in blue whereas the Gunnison, Sopris, and Yampa RDs seem to have a large proportion of risky terrain; yet, very few MCS have been previously discovered among

them. With the exception of the Boulder RD and a small section within the Aspen RD close to the southern Sopris RD border, these findings appear to contradict this study's overall hypothesis in that areas at highest risk were expected to overlap more significantly among the RDs having higher MCS counts and plant seizures and vice versa for RDs with lower MCS activity.

Drilling down into the data further, the Aster to Points geoprocessing tool was conducted on the above-mentioned risky terrain raster layer to convert the grid cell values to points so that a Spatial Join geoprocessing tool could then be executed to summarize the grid cell values by RD. To that end, Table 2 below reveals the total number of grid cells by the number of converging risk factors and RDs as well as the percentages of no to low risky terrain versus the riskiest terrain across the RDs. Also, Table 3 provides grid cell value counts and overall averages by RD so that comparisons can be made between the risky terrain raster data and known MCS data. Indeed, both the risk map and the tabulated data in Tables 2 and 3 reveal that the South Platte, San Carlos, and Aspen RDs have larger amounts of no to low risky terrain than they do risky terrain despite having had the highest MCS counts and plant seizures between 2009 and 2016. This finding suggests that the RDs having the highest MCS activity in the past do not necessarily have more risky terrain than do the RDs with lower previous MCS activity. In fact, follow-up correlation analysis proves this point in that the relationship between the number of discovered MCS and risky terrain (i.e., involving the convergence of 6 or more risk factors) was inversely moderately related (r=- 0.32). The same was true when risk value grid cell averages were correlated with discovered MCS counts (r=-0.35).

Table 2

Grid Cell Counts by Total Number of Converging Risk Factors & RDs and No-Low/Highest Risky Terrain Percentages

	Number of Converging Risk Factors													
Ranger Districts	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**11**	**Total**	% No-Low Risky Terrain	% Risky Terrain
Aspen	12	39	72	110	123	122	74	36	11	1	0	600	38.83%	20.33%
Boulder	1	4	13	25	58	110	145	110	33	2	0	501	8.58%	57.88%
Canyon Lakes	0	8	34	182	531	620	411	126	16	1	0	1,929	11.61%	28.72%
Gunnison	6	51	110	314	644	832	662	276	52	4	0	2,951	16.30%	33.68%
Hahns Peak-Bears Ears	4	4	45	165	307	361	194	49	8	1	0	1,138	19.16%	22.14%
Pikes Peak	0	2	7	48	163	204	136	46	3	0	0	609	9.36%	30.38%
Rifle	0	1	4	79	208	210	125	31	6	0	0	664	12.65%	24.40%
San Carlos	7	22	82	165	244	221	108	21	4	0	0	874	31.58%	15.22%
Sopris	9	29	59	130	251	237	181	70	20	2	1	989	22.95%	27.70%
South Platte	1	12	59	186	293	246	150	46	5	0	0	998	25.85%	20.14%
Yampa	1	9	70	170	171	219	165	44	2	0	0	851	29.38%	24.79%
Totals	41	181	555	1,574	2,993	3,382	2,351	855	160	11	1	12,104		
Averages	3.73	16.45	50.45	143.09	272.09	307.45	213.73	77.73	14.55	1.00	0.09	-		

Table 3

MCS & Grid Cell Statistics by Ranger Districts

Ranger Districts	Discovered MCS	Eradicated Plants	Area (sqmi)	Risk Value Grid Cell Counts	Risk Value Grid Cell Averages	Risk Value Grid Cell Standard Deviations
South Platte	17	53,915	703.40	998	4.36	1.33
San Carlos	11	67,634	659.71	874	4.11	1.39
Aspen	6	6,565	429.63	600	4.01	1.77
Boulder	5	13,854	384.45	501	5.61	1.48
Canyon Lakes	3	4,624	1,311.84	1,929	4.84	1.19
Pikes Peak	3	26,200	442.20	609	4.92	1.14
Hahns Peak-Bears Ears	2	100	782.27	1,138	4.57	1.26
Gunnison	1	5	2,121.62	2,951	4.85	1.44
Rifle	1	0	490.58	664	4.73	1.12
Sopris	1	500	676.63	989	4.54	1.59
Yampa	1	30	616.91	851	4.41	1.42
Totals	51	173,427	8,619.22	12,104	-	-
Averages	4.64	15,766	783.57	1,100	4.63	1.37

In contrast, the Boulder RD has the highest proportion of risky terrain at 58% seen in Table 2 and the highest averaged risk grid cell value of 5.61 (i.e., averaged convergence of six risk factors across entire RD) displayed in Table 3; yet, is the fourth highest in MCS counts and plant seizures. Similarly, both the Canyon Lakes and Pikes Peak RDs are made up of significantly more risky terrain (29-30%) than no to low risky terrain (9-12%) even though much less MCS activity has been traditionally reported among them. Furthermore, the Pike Peak RD has the second highest averaged risk grid cell value of 4.92 whereas the Canyon Lakes RD has the fourth highest at 4.84. On the flip side however, the Gunnison RD also has a higher amount of risky terrain (34%) versus no to low risky terrain (16%) and the third highest averaged risk grid cell value of 4.85; yet, only one MCS has been previously discovered there with only five plants eradicated.

One important aspect to consider revealed in Table 3 is the extent to which the size of the RDs influence the risk value grid cell counts and overall averages. For instance, the Canyon Lakes and Gunnison RDs are significantly larger areas (i.e., 1,312 & 2,122 sqmi) compared with the average RD size of 783.57 square miles and have significantly higher risk value grid cell counts than the other RDs. This finding is not completely consistent in that the Boulder and Pike Peak RDs are much smaller than the average RD and yet both have the highest risk value grid cell averages.

While these results provide insight into what areas across each are suitable for an MCS, as previously stated there are 3,378 1,600 x 1,600-meter grid cells shaded in red that represent the highest risk (i.e., convergence of 6 risk factors or more) for the cultivation of marijuana, which make up a very large portion of the forest in Colorado. Trying to recommend to law enforcement that all of these high-risk grid cells in red are potential areas where MCS might be discovered is not particularly useful or helpful. That said, using the mean of the averaged risk value across all 11 MCS RDs of 4.63 and the mean of the standard deviation risk value of 1.37, z-scores were calculated to determine at what point converging risk factors were in areas representing statistically significant risky terrain. Statistical significance (i.e., z-score 1.96 and above) appears to be reached minimally somewhere between the convergence of seven and eight risk factors. Figure 7 shows the zoomed result of the statistically significant grid cells by RD.

Figure 7

Statistically Significant Risky Terrain for Potential MCS by Colorado Forest RDs Sorted in Ascending Order by Highest Grid Cell Counts

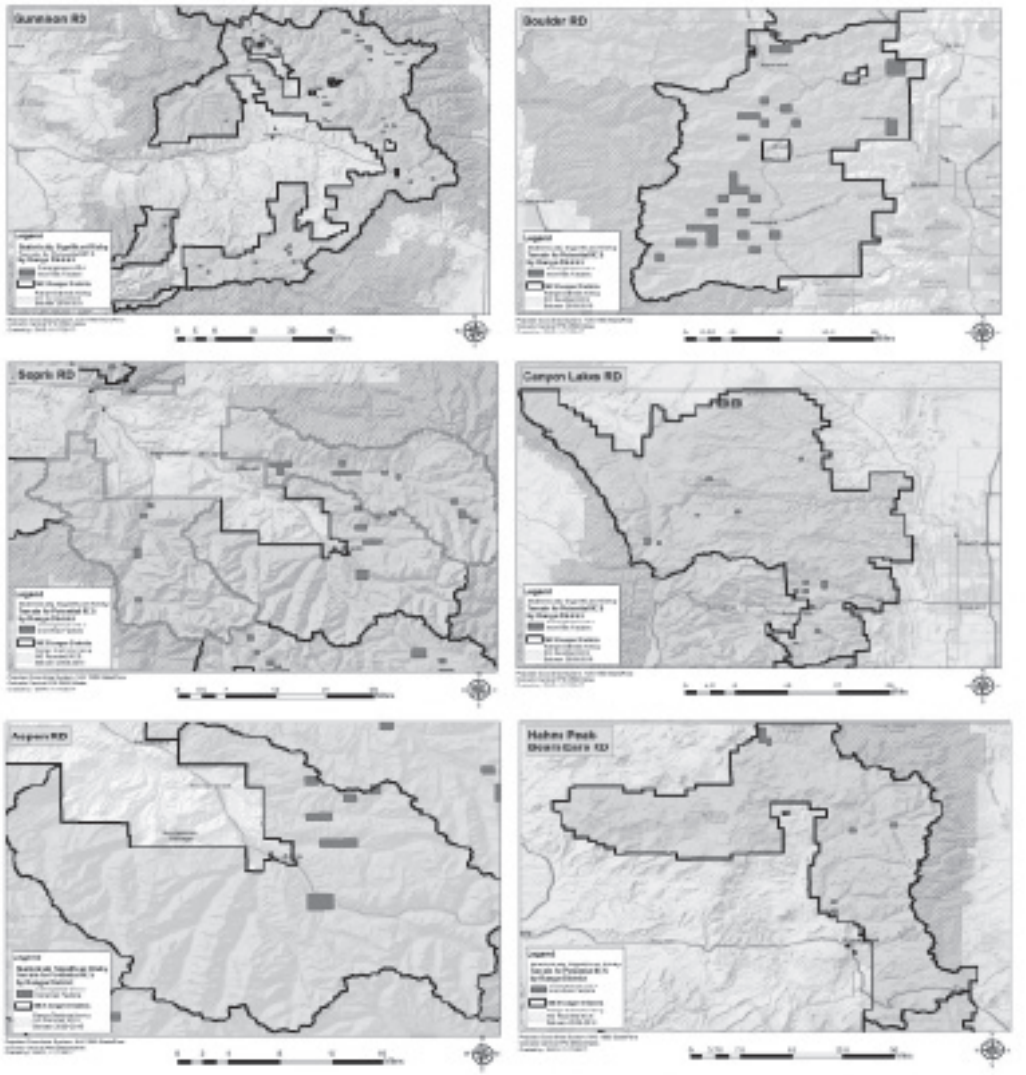
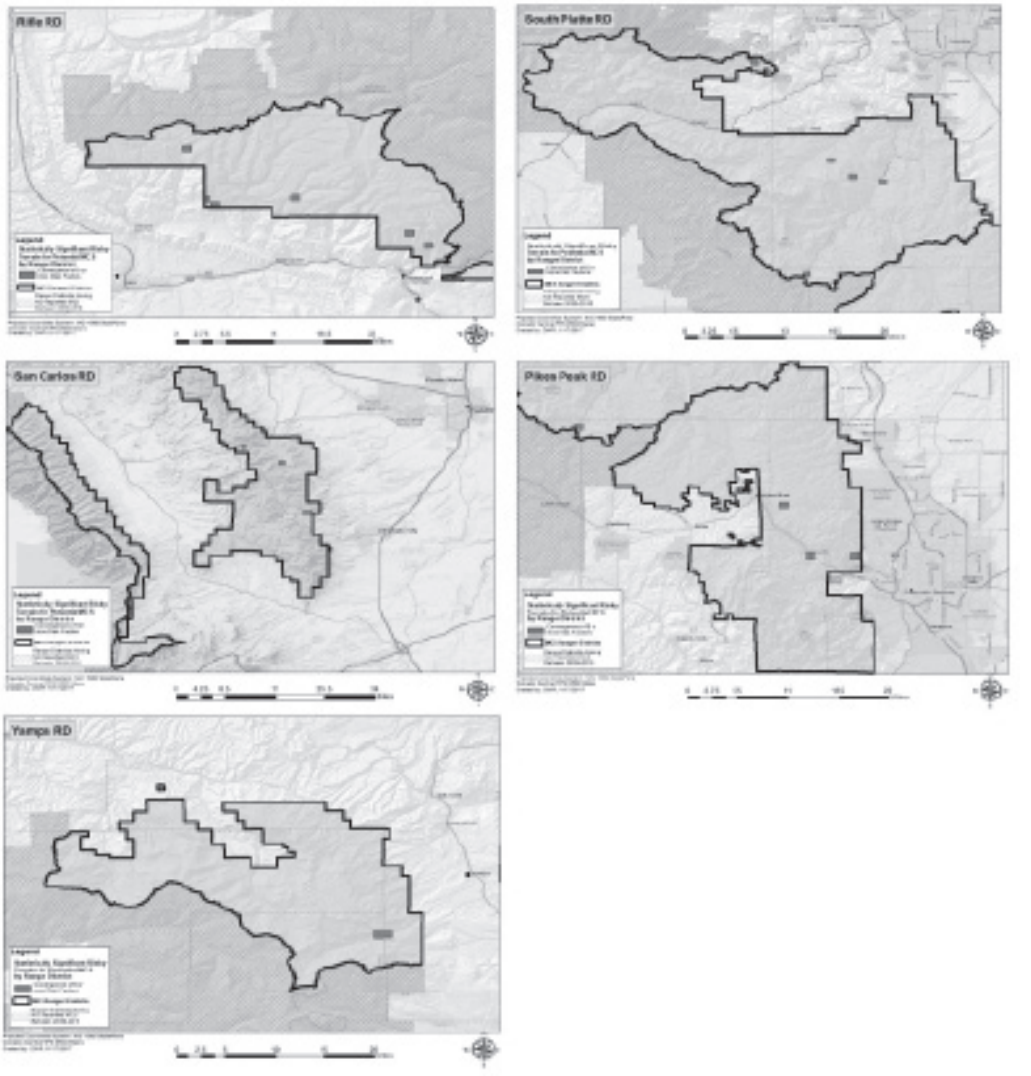


Figure 7 CONTINUED



Summary, conclusions, & recommendations

This study sought out to utilize traditional RTM as a GIS and statistical method for determining suitable MCS areas across national forests in Colorado. It was successful in this endeavor in that it showcased how a RTM process could be used to determine risky terrain for marijuana cultivation across Colorado national forests based on a combination of environmental/ topographical and human/behavioral risk factors identified throughout the literature to be influential and predictive of potential MCS locations. In addition, this approach illustrated how practitioner information (i.e., impromptu LEO conversations) could be beneficial to the overall model when utilized in tandem with findings reported across multiple studies. However, the most remarkable aspect of this study's use of RTM was that it identified areas of risky terrain for potential MCS development across Colorado's national forests without being provided specific locational information (i.e., latitude/ longitude) of where MCS had been previously discovered. Nevertheless, the results produced by this study were somewhat surprising.

For instance, it was expected that those RDs having had higher counts of MCS discovered and plants eradicated in the past would contain more areas of risky terrain compared to RDs having had fewer MCS discovered. This hypothesis was believed to be true based on the fact that growers were repeatedly choosing to set up MCS across certain RDs over others throughout Colorado for very specific reasons, presumably due to general site accessibility, proximity to water sources, direct prolonged exposure to sunlight, lower elevation, etc. Instead, the results of this study revealed almost the opposite whereby the RDs with the highest discovered MCS activity in the past (i.e., South Platte, San Carlos, & Aspen) had among the smallest percentages (15-20%) of risky terrain, averaged risk cell values ranging from 4.01 to 4.36, and lower than average statistically significant grid cell counts where 8 or more risk factors converged. In fact, these three RDs had disproportionately higher no to low risky terrain percentages (26- 38%) compared with other RDs that had much lower previously discovered MCS counts such as the Gunnison, Sopris, Yampa, and Rifle RDs. The zoomed maps showing the potential risky terrain for the cultivation of marijuana among the South Platte, San Carlos, and Aspen RDs compared with others reveal the noticeable contrast of blue shading compared with red indicating larger amounts of unsuitable MCS terrain. This pattern becomes particularly evident upon visual inspection of the zoomed risky terrain maps where eight or more risk factors converge indicating the riskiest terrain.

Nevertheless, it should be noted that there are areas of risky terrain across these three RDs that would be suitable for the cultivation of marijuana. For instance, the south central region of the South Platte RD, pockets among the most northeastern section of the San Carlos RD, and along the Sopris/Aspen RD borders on the northeastern part of the Aspen RD all appear to be areas prime for marijuana cultivation. Moreover, the riskiest areas depicted in the zoomed maps where eight or more risk factors converge support this line of reasoning.

Taken together, based on these findings, why were the relationships between the number of discovered MCS, plants eradicated, and risky terrain (i.e., involving the convergence of six or more risk factors) across the 11 RDs inversely related (r=-0.32 – -0.34)? More specifically, why were certain RDs particularly the South Platte and San Carlos targeted by growers to a much larger extent than other RDs and yet contain much less suitable area (i.e., risky terrain) for MCS development? Perhaps, the RDs in closer proximity to Interstate-25 (i.e., a major thoroughfare) and overall closer to the Denver- metro area make them more accessible in general. Obviously, it is not necessary for growers' to travel long distances such as to Gunnison, Aspen, or even northwest toward Craig to identify suitable sites to set up marijuana grows. Aside from the accessibility factor, benefits of choosing sites in close proximity to a metropolitan area is that the elevation is generally lower, the slope is relatively flat, temperatures are more consistent, etc. Also, these RDs (i.e., South Platte, San Carlos, Boulder, Pikes Peak, Canyon Lakes) are closer to Interstate-25 and/or larger towns/cities and have a well-integrated network of roads and plenty river/stream segments where water source availability and proximity is likely to be conducive to setting up a MCS.

STUDY LIMITATIONS

Despite the fact that this study successfully employed an RTM strategy to identifying potential MCS across national forests throughout Colorado, the overall predictive validity

cannot be evaluated as a result of being provided counts at the polygon RD level by the USFS. Instead, specific locational information such as latitude/longitude coordinates would be required in order to legitimately validate this study's efficacy in determining whether identified areas of risky terrain are spatially close in proximity to previously discovered MCS. Only then could the model's overall performance be conclusively evaluated.

Also, although beyond the scope of this study, an additional methodological aspect that could assess the overall effectiveness of the specified model would be to determine which risk factors are the most predictive in identifying potential MCS locations. This approach is reflective of a more modern-day RTM approach where Relative Risk Values could be calculated for risk factor comparisons essentially interpreted as odds ratios where the best risk terrain model with the lowest Bayesian Information Criterion scores between Poisson and negative binomial distributions would be selected (Caplan and Kennedy, 2016). That said, this methodology requires the outcome variable, in this case MCS locations, be a point file. Perhaps as suggested by Bouchard, Beauregard, and Kalacska (2013), the selection of a suitable MCS was based on only three risk factors, namely proximity to the nearest road, physical accessibility to the site measured by elevation, and the simplicity of setting up a potential site measured by proximity to water sources for the purposes of diverting it to the site.

RECOMMENDATIONS

First and foremost, based on the results of this study, it is recommended that the USFS's Rocky Mountain Region Law Enforcement & Investigations Division cross-reference the 172 riskiest areas identified across the 11 RDs where eight or more risk factors converged with the actual locations of the 51 MCS discovered between 2009 and 2016. Secondly, if not already accomplished, it is recommended that the USFS employ a comparable examination of known MCS locations across Colorado national forests to determine the risk factor distances and value ranges of all 51 sites discovered so that more precise specifications can be applied in future data modeling. Lastly, given that marijuana is recreationally as well as medically legal in Colorado, it is recommended that the USFS investigate the extent to which the regional variation in marijuana prices across different areas of Colorado influence the incidence of marijuana cultivation.

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Prior to Western Union, he was a Crime Analyst with Adams County Sheriff's Office assigned to the Detective Division for six years. Mr. Richardson was a member of the Colorado Crime Analysis Association where he participated in training and information sharing among fellow Denver-area crime and intelligence analysts. He provided several seminars to members on a variety of topics. He holds two Masters of Science degrees from New Mexico Highlands University in Psychology (2005) and in Geographic Information Science (2018).

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Appendix: Methodology Specifics

Figure 1

Geoprocessing tasks run for vector & raster environmental risk factors

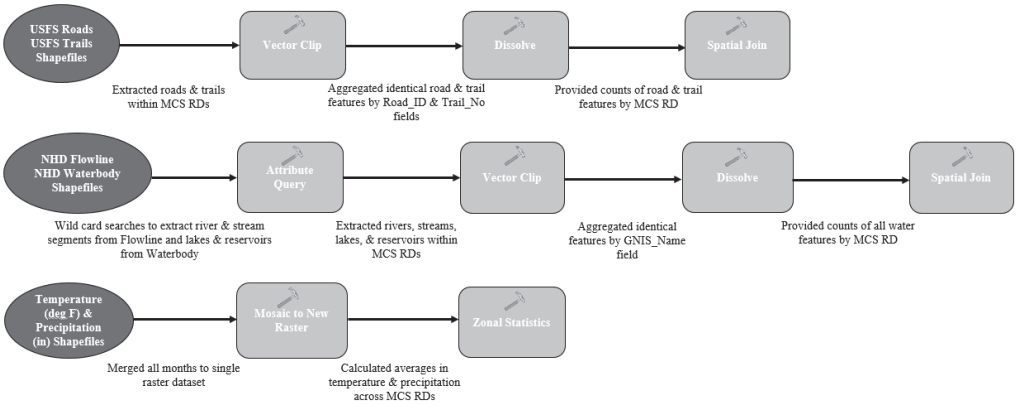


Figure 2

Geoprocessing tasks run for raster topographical risk factors

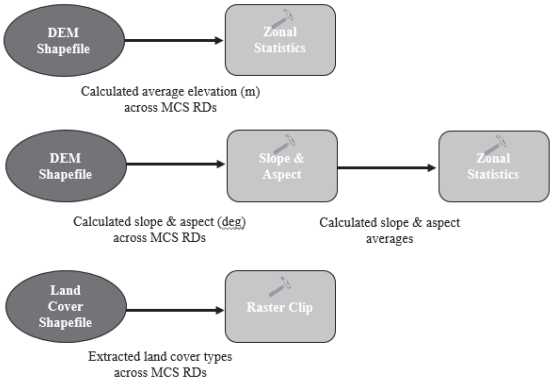


Figure 3

Geoprocessing tasks run for human/behavioral risk factors

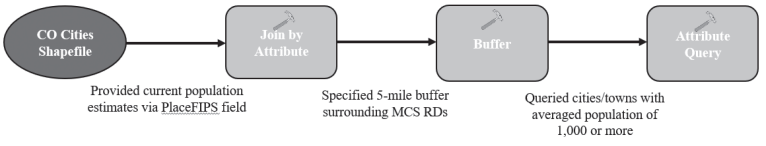
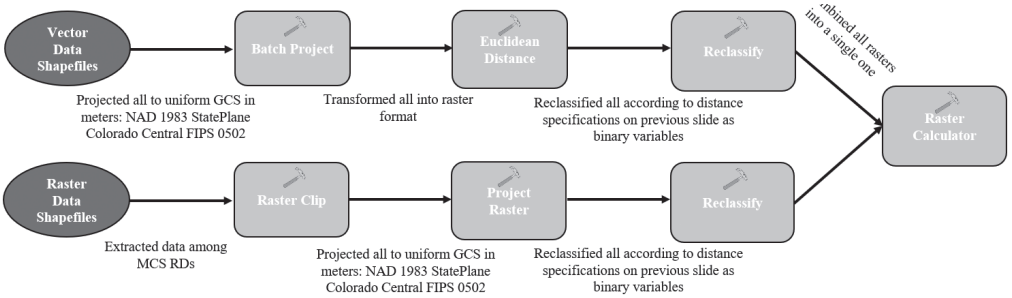


Figure 4

Model specification & variable reclassification geoprocessing tasks run for conversion to a single raster



The above figure illustrates the data modeling geoprocessing tasks that were executed to combine the two different data types into a single raster layer. All shapefiles were projected to the following geographic coordinate system in meters: NAD 1983 StatePlane Colorado Central FIPS 0502. The Euclidean Distance geoprocessing tool was run on all of the vector shapefiles to transform them into raster format and then reclassified according to the above-described specifications summarized in Table 9 as binary variables either being within the specified distance or value range (value of 1) or not (value of 0). The Raster Clip geoprocessing tool was conducted on each of these raster files to extract risk factor values from within the MCS district boundaries and the Reclassify geo-processing tool was then utilized to reclassify each raster file according to the above-summarized specifications. Upon completion, all 12 reclassified raster files were loaded into an ESRI ArcMap session and the symbology was modified to reflect no color fill for the zero values and a light red fill for the values defined as a 1. The Raster Calculator geo-processing tool was then opened and each of the 12 reclassified raster files were loaded into the tool unweighted and subsequently run. The resulting output was a single raster file that took into account the intensity and overall influence of each risk factor across all 11 MCS Districts to produce a risk map that shows the riskiest terrain for the cultivation of marijuana based on the convergence of all 12 risk factors combined.

NOTES

SUPPORTING AGENCIES

Arizona Department of Public Safety
Bureau of Alcohol, Tobacco, Firearms and Explosives
California Department of Justice – Division of Law Enforcement
Canadian Police College
Illinois State Police
Mid-Atlantic Great Lakes Organized Crime Law Enforcement Network
Mid-States Organized Crime Information Center
New England State Police Information Network
Ontario Provincial Police
Regional Organized Crime Information Center
Rocky Mountain Information Network
Royal Canadian Mounted Police
Western States Information Network

ACADEMIC INSTITUTIONS

American Military University
Farmingdale State College (SUNY)
Henley-Putnam University
Utica College

CORPORATE MEMBERS

Blue Light
DataWalk
ESRI
GeoTime
International Anti-Crime Academy
LE CellTrack
LexisNexis Risk Solutions
Media Sonar
Musubu
Ntrepid

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